LIVES
OF
GAME ANIMALS

LIVES
OF
GAME-ANIMALS

PLATE I.—WAPITI GROUP, MALE AND TWO FEMALES

(*Cervus canadensis* Erxleben)

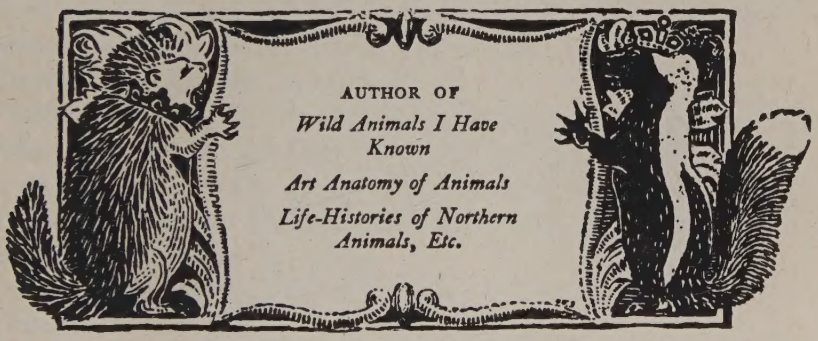
LIVES
OF
GAME ANIMALS

An Account of those Land Animals in America, north of the Mexican Border, which are considered "Game," either because they have held the Attention of Sportsmen, or received the Protection of Law.

BY

ERNEST THOMPSON SETON

FELLOW NEW YORK ZOOLOGICAL SOCIETY
MEMBER NAT. INST. ARTS AND LETTERS



WITH 50 MAPS AND 1500 ILLUSTRATIONS
BY THE AUTHOR

VOLUME III
HOOFED ANIMALS

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FOREWORD OF COMFORT

I sat on a low cliff above the booming surf to-day. The tide was coming in. The broad reef, shaggy with seaweed of richest hues, was part of the glory of the incoming tide—roaring, heaving, irresistible, and beautiful as it was a million years ago. And I found comfort in the thought that, though the West be defiled and despoiled of its wild life and its beauty, this at least will go on and on, unchanged, unconscious, and forever untouched by the spoliating hand of man.

THE SCOPE

VOLUME I

CATS, WOLVES, AND FOXES

VOLUME II

BEARS, RACCOONS, BADGER, SKUNKS, AND WEASELS

VOLUME III

DEER, ANTELOPE, BUFFALO, SHEEP, AND PECCARY

VOLUME IV

SQUIRRELS, RABBITS, ARMADILLO, AND OPOSSUM

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LIVES
OF
GAME ANIMALS

Volume III

Order Ungulata or Hoofed Animals
DEER, ANTELOPE, SHEEP, CATTLE, AND PECCARY

ORDER *UNGULATA* OR HOOFED QUADRUPEDS

Large animals with 4 toes on each foot, one group (the Pronghorns) having but 2 on each foot, and one (the Peccaries) 3 on each hind foot. Teeth developed to grind, as the food is chiefly vegetable.

I. Family Cervidæ—the Deer

Large, digitigrade, ruminant animals, with 4 hoofed toes on each foot; legs long and slender; neck long; tails short or medium; muzzle prolonged; ears large. The males (and sometimes the females) have branching, bony antlers which are grown and shed periodically. They have 4 active mammæ, and no gall-bladder. They are clad in coarse, dense hair. Teeth made for grinding, the upper incisor lacking; upper canines often present.

$$\text{Teeth usually: Inc. } \frac{0-0}{4-4}\text{; prem. } \frac{3-3}{3-3}\text{; mol. } \frac{3-3}{3-3} = 32$$

Genus *Cervus* Linnæus. Very large Deer with very short tails. Antlers on males only with rounded beams, and tines not palmated. Teeth as above with addition of 2 canines in upper jaw.

Genus *Rangifer* H. Smith. Large Deer, both sexes bearing antlers. Antlers much palmated. Muzzle hairy; neck maned; hoofs deeply cleft, the hind hoofs or clouts long enough to touch the ground. Teeth sometimes as in *Cervus*, i. e., with upper canines.

Genus *Alces* Gray. The largest of living Deer. Antlers in males only, and greatly expanded into one broad palm. Muzzle long and overhanging; hairy except for a small triangle in front. Neck short. Tail very short. Ears long. On the throat a long dewlap or bell. No canines.

Genus *Odocoileus* Rafinesque. Medium sized or small Deer, of elegant form, with a conspicuous tuft of hair on the metatarsal between heel and hoof; this covers a gland. They have also many peculiarities of internal anatomy.

II. Family Antilocapridæ or Pronghorns

Middle-sized ruminants, with 2 hoof-clad toes on each foot. Horns of true horn, and carried on a bony core, but shed each year; found in both

sexes. Teeth normal. An elaborate system of glands. 4 mammæ; a gall-bladder. Tail very small. Nose nearly all hairy. Teeth as in *Cervidæ*.

Genus *Antilocapra* Ord, as above.

III. Family Bovidæ, or Oxen, Goats, and Sheep

Mostly large ruminants. All have 4 hoof-clad toes on each foot. Horns in both sexes, hollow and of true horn on a bony core. Teats, 2 or 4; tail various; teeth as in *Cervidæ*.

Genus *Oreamnos* Rafinesque. Medium-sized, with short erect horns; a beard on chin; nose hairy; coat thick, long, and white, much obscured by the abundant white wool or underfur. Tail very short; teats, 4; teeth, normal.

Genus *Ovis* Linnæus. Medium-sized, or large animals, with close hairy coats; short tails and ears; stocky bodies; no beard; horns in both sexes, very large, massive, and corrugated in the male, going out in a circular sweep; 2 teats; teeth normal.

Genus *Ovibos* de Blainville. Large animals with long, deep, shaggy coats; nose hairy; horns in both sexes sweeping down, out, and up. Ears short; tail rudimentary; 4 teats as in Cattle; teeth normal.

Genus *Bison* H. Smith. Huge animals, covered with a shaggy mane on head, neck, and shoulders; tail rather long and tufted; horns in both sexes, black, cylindrical, and up-curved; general colour dark brown or black; 4 teats in cows; teeth normal.

IV. Family Tayassuidæ, Peccaries or American Swine

Middle-sized, digitigrade animals, clad in bristles; teeth in both jaws well developed; snout long and piglike; tail reduced to a knob; 4 toes on front feet, 3 on hind. A musk-gland on the middle of back.

Genus *Pecari* Reichenbach, as above.

$$\text{Teeth: Inc. } \frac{2-2}{3-3}\text{; can. } \frac{1-1}{1-1}\text{; prem. } \frac{3-3}{3-3}\text{; mol. } \frac{3-3}{3-3} = 38$$

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THE BUCK THAT GOT AWAY.

THE WONDER BUCK

Wapiti, Elk, Canada Stag, American Red-Deer, Round-Horned Elk, Gray Moose

Cervus canadensis Erxleben

(*L. Cervus*, a stag; *canadensis*, of Canada)

Cervus elaphus canadensis Erxleben, 1777, Syst. Reg. An., I, p. 305.
Cervus canadensis Schreber, 1783, Säugthiere, V, pl. 246a.

Type Locality—Eastern Canada, i. e., Quebec, probably near Montreal

French Canadian, *le Cerf* (male); *la Biche* (female); *le Wapiti.*
Cree, *Mus-koose.* Richardson gives also as Cree names, *Wawaskeeshoo*, *Awaskees*, and *Moostoosh*[1]
Ojibway & Sauteaux, *Mush-koose.*
Shawnee, *Wapiti.*
Yankton Sioux, *Eh-kahg-tchick-kah.*
Ogallala Sioux, *Hay-hah-kah* (male).

The Deer Family, or *Cervidæ*, are hoofed ruminant mammals, with solid antlers that are grown and shed periodically. They have 4 hoofs on each foot, the hinder pair much smaller than the front; no gall-bladder; mammæ, 4; tear-pit below inner corner of eye well developed.

Teeth: Inc. $\frac{0-0}{4-4}$; can. $\frac{1-1}{0-0}$, or wanting; prem. $\frac{3-3}{3-3}$; mol. $\frac{3-3}{3-3}$ = 32 to 34

The genus *Cervus* (Linnæus, 1758), of which the European Red-deer is the type, and to which the Wapiti belongs, is characterized by great size; many-tined antlers, of which the beam is behind; well-marked brow and bez-tines; spotted colouring of the fawns; short tail; naked, moist muzzle; maned neck; a tuft of hair on inside of hock, and within this a scent-gland (tarsal gland).

Teeth: Inc. $\frac{0-0}{4-4}$; can. $\frac{1-1}{0-0}$; prem. $\frac{3-3}{3-3}$; mol. $\frac{3-3}{3-3}$ = 34

The "Elk tusks" are the rudimentary canines; they are found in both sexes, but are much reduced in size in the ♀.

[1] F. B. A., I, p. 251.

In the collection of E. W. Darbey, Winnipeg, is a bull Elk jaw with two sets of tusks.

The Wapiti has all the characteristics of its family and genus. Its specific peculiarities of size, colour, etc., may be recognized by the following:

Size. A 3-year-old bull that I measured in Wyoming was: Length, 102 in. (2590 mm.); tail, $5\frac{1}{2}$ in. (140 mm.); hind foot, 25 in. (635 mm.); height at withers, $47\frac{3}{4}$ in. (1214 mm.).

As extremes: Caton had a 5-year-old bull Wapiti over 16 hands (or 64 in.) at the withers,[2] and C. Phillipps-Wolley records[3] a Colorado bull, measured by Andrew Williamson, at 17 hands, or 5 ft. 8 in. at the shoulder, 9 ft. long, and 6 ft. 8 in. around the chest; that is, 2 ft. longer and 20 in. higher than the 3-year-old specimen above mentioned.

An adult cow, which I measured on the Graybull, in Wyoming, Oct. 12, 1898, was: Length, 88 in. (2235 mm.); tail, $4\frac{1}{2}$ in. (114 mm.); hind foot, 25 in. (635 mm.); height at withers, 56 in. (1420 mm.).

Weight. The 3-year-old bull, whose dimensions are given above, weighed 550 lbs. after bleeding; another 3-year-old, taken at the same time and place, weighed $531\frac{1}{2}$ lbs. after bleeding. Judge Caton had a very large 3-year-old that weighed 650 lbs.[4] He thought[5] 600 lbs. would exceed the average live weight of a full-grown buck, although he believed that they sometimes reached 1,000 or 1,100 lbs.

M. P. Dunham states[6] that he weighed an Elk at a little over 800 lbs. after entrails were removed. This would give a live weight of about 1,000 lbs. (The rule for Deer is: Add a quarter to the dressed weight to find the live weight.)

We may safely affirm, then, that an average bull Wapiti at full growth stands nearly 5 ft. at the withers, and weighs about 700 lbs.

The cow, whose dimensions are given above, weighed $490\frac{3}{4}$ lbs. after bleeding.

Hornaday found[7] that a new-born fawn or calf weighed $30\frac{1}{2}$ lbs.

Colour. The body colour of a young bull Wapiti killed in Jackson's Hole, Wyo., Sept. 10th, was brownish gray, a little darker along the spine, and becoming dark chestnut or brown on head, neck, and legs, and reddish-

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[2]Antelope, etc., p. 81.
[3]Big-Game Shooting, I, The Badminton Library, 1894, p. 406.
[4]Antelope, etc., p. 81.
[5]As above, p. 82.
[6]Recreation, April, 1896, p. 193.
[7]American Natural History, 1904, p. 122.

brown or sienna colour on breast and belly. The inside and lower back part of ears, a patch around the eye, a spot on each side of the lower lip, and a spot under the jaw, were very pale brown or dull brownish white; the disk or rump patch very large, of a pale, buffy white, and continued above the tail, which was of the same colour; bordering this patch in front, on each ham, was a brownish black stripe that nearly faded out toward the spine, where it joined its fellow.

The peculiarities of the disk are diagnostic of the various species of *Cervus*. Some, like the Red-deer of Europe, have dark mark crossing from spine to tail, some have the tail of a different colour; the Wapiti has tail and disk of one even shade, or but slightly yellower above the tail.

As this coat ages, it fades greatly. In spring, I have seen bulls so bleached that, at a distance, their bodies looked nearly white, thus justifying the name Wapiti (which is supposed to be from the Algonquin roots *wab*, white, and *atik*, Deer), and the New England name of "Gray Moose."

The summer coat, worn from May to September, is a little deeper in colour than the winter coat.

The ♀ s, or cows, in summer coat resemble the ♂ s; but in fall and winter coat, they are less intense in colour, and sometimes have a dark shade uniting the tail with the spine.

The calf or fawn, when born, is dull yellowish, thickly dappled on body, neck, and thighs, with large spots of dull white. In late September, when the first winter coat appears, these spots are lost.

Races

Five forms of Wapiti have been recognized:

canadensis Erxl., the typical form. T. l., Eastern Canada, i. e., Quebec, in vicinity of Montreal.

occidentalis H. Smith, the very dark Wapiti of the Olympics and West Coast. T. l., extreme western North America.

merriami Nelson, paler and more reddish than the typical form. T. l., head of Black River, White Mts., Ariz.

nannodes Merriam, the very pale and dwarfed Wapiti of Southern California. T. l., Buttonwillow, Calif.

manitobensis Millais, a very dark form with sandy brown upper parts and small antlers. T. l., Manitoba and eastern Saskatchewan.

They have also marked cranial differences.

History

In 1535, Jacques Cartier ascended the St. Lawrence as far as Hochelaga—now Montreal. On his return, he reported[8] "great stores of Stags, Deere, Beares, . . . other such like sorts of Beasts." He saw, then, *two* kinds of Deer. We know that both Whitetail and Wapiti abounded in the country where he wintered. The Wapiti has always been the "Stag" *in* Canada, as well as the "Stag" *of* Canada. So this we believe to be the first record of the Wapiti being seen by white men.

There is just a possibility that Cartier was antedated by Niña de Guzman, who, according to Herrara,[9] in 1532 explored the west coast of Mexico, near north latitude 28°, and reported that "many Cattle and many Deer of very large size were found on the banks of the Yaquimi."

In 1605, Captain George Weymouth, in his "Voyage to Virginia," found, according to Rosier, "Deere, red and fallow, Beares, etc. . . . Some like our other Beasts, the Savages signe unto us with horns and broad ears, which we take to be Olkes or Loshes."[10]

This is the earliest-known printed use of the word "Olkes" or "Elk" with reference to the American animal. It appears in the latter form in 1650, when Virginia is credited not only with abundance of Deer, but also with "Elks bigger than oxen."[11]

Champlain's map (1632)[12] marks the region of Kingston, Ontario, as "Lieu où il y a force Cerfs," and with a portrait of a Stag, certainly not that of either a Virginia Deer, a Moose, or a Caribou.

In 1653–54,[13] Father Lemoine, voyaging on the St. Lawrence a few leagues above Montreal, found great droves of creatures (Wild Cows) which from his description must have been Wapiti.

After this date, the number of travellers increased in America, and their accounts frequently included descriptions of the "Great Stag that was of the bigness of a Horse," and whose numbers were so great, in the high country, that their trails through the woods were convenient ways of travel.

Thus, Mark Catesby, in 1731, remarks[14] on "the Stag of America. . . . They usually accompany the Buffaloes, with whom they range in droves in the upper and remote parts of Carolina, where, as well as in our

[8]Hakluyt, Voyages, III, p. 225.
[9]Hist. Ind. Oc., 1728, Tom III, p. 16, cited in Allen's American Bison, p. 518.
[10]Purchas, IV, 1625 ed., p. 1667.
[11]Force, Coll. Hist. Trav., III, No. 11, p. 11.
[12]Champlain's Voyages, 1632.
[13]Relation de la Nouvelle, France, 1653–54, p. 93.
[14]Nat. Hist. Car., Flor. & Bah. Ids., II, 1731–43, p. xviii.

other colonies, they are improperly called Elks. The French in America call this beast the *Canada Stag*. In New England, it is known by the name of the 'Gray Moose,' to distinguish it from the preceding beast, which they call the 'Black Moose.'"

In 1777, Erxleben recognized the Wapiti as a new animal, and gave it the distinctive name of *canadensis*.

In March, 1806, Dr. B. S. Barton published[15] "An account of the Cervus Wapiti or Southern Elk of North America." He remarks: "As the Elk has not, to my knowledge, been described by any systematic writer on Zoology, I have assumed the liberty of giving it a specific name. I have called it *Wapiti*, which is the name by which it is known among the Shawnese or Shawnees Indians. . . . This animal is generally known in Pennsylvania and in other parts of the United States by the name of Elk."[16]

This is the first use in print of the word "Wapiti," so far as known, and should settle several old disputes as to the origin and application of the name.

Primitive Range

The map sets forth sufficiently the range of the various forms of Wapiti. It is founded on the records of over three hundred travellers and historians, and compiled with assistance from the Biological Survey of the United States Department of Agriculture. The outlying records (marked with X on the map) are as follows:

In Mexico by Guzman, as already given.

The Ottawa Valley was well known as Elk country until about a hundred years ago. According to W. P. Lett,[17] "The Wapiti . . . was formerly quite numerous in the Ottawa Valley. . . . Found more generally . . . on the southern shore of the river. One hundred years ago, these animals were still present in considerable numbers in the county of Carleton, the hard-wood forests of which were their favourite haunts. The horns of the Wapiti are still quite frequently turned up by the plough in the vicinity of the city of Ottawa. . . . Mr. Rice Honeywell, one of the earliest settlers in this region, positively affirms that within the last 70 years, he has seen the Wapiti both alive and dead on the old Thompson farm, within 4 miles of the city of Ottawa. Mr. Honeywell knows well the difference between a Wapiti and a Moose, as he frequently saw many of the latter in the same locality."

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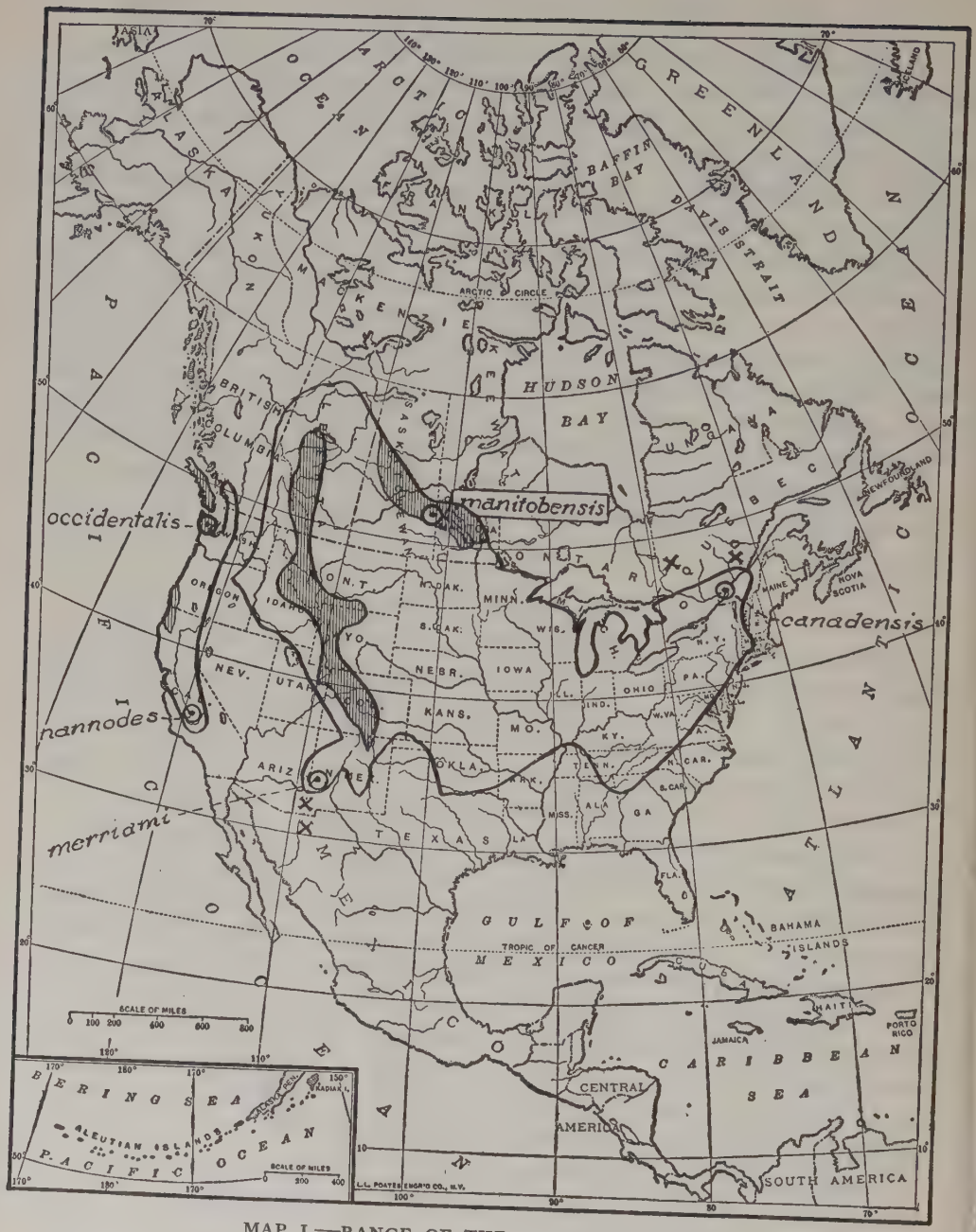
[15]Phila. Med. & Phys. Journ., March, 1806, Art. VII, pp. 36–55.

[16]As above, p. 37.

[17]Trans. Ott. Nat. Field Club, 1884, No. 5, pp. 101–17.



MAP I.—RANGE OF THE WAPITI OR ELK

By E. T. Seton, with assistance of the Biological Survey

The heavy outline shows the primitive range; the shaded portion the range in 1926 (Wild Elk only). The crosses are extralimital records discussed in the text.

H. Y. Hind says: "Charles Taché enumerates the Elk and Groundhog as common about the Saguenay previous to 1823. . . . The Moose was also very common."[18]

At the Sportsman's Show, New York, March 2, 1899, L. Z. Joncas, Superintendent of Fish and Game for the Province of Quebec, exhibited 3 Wapiti heads said to have been taken near Lake Victoria, at the sources of the Ottawa, in Pontiac County about 1896. Several small bands of the primitive Elk, he was told, still exist in those wilds. He personally did not follow the matter up, and the record is very questionable. These heads I examined.

In 1914, when I was in Calgary, George F. Dippie, the taxidermist, showed me an Elk head that was taken near North Bay, Nipissing, Ontario, about 1893. He believed it was of wild stock. It was very dark and large.

When Sir Alexander Mackenzie went on his famous canoe journey in the far Northwest, he wrote of the Red Deer and Dauphin region in 1789: "All this country to the South branch of the Saskatchiwine, abounds in Beaver, Moose-deer, Fallow-deer, Elks, Bears, Buffalos, etc."[19]

It is well known that Elk River (now the Athabaska) was so named from the number of Elk frequenting its valley. There is also an Elk Island in Great Slave Lake at the mouth of Slave River.

Mackenzie, writing in June, 1789, when on the Lower Slave River just below the mouth of the Peace, says: "The Indians informed me that, at a very small distance from either bank of the river, are very extensive plains, frequented by large herds of Buffaloes, while the Moose and Reindeer keep in the woods that border on it."[20]

Again, when wintering on the Peace River, Dec., 1792, at the foot of the Rockies and at about longitude 118° W., he writes: "On either side of the river, though invisible from it, are extensive plains, which abound in Buffaloes, Elks, Wolves, Foxes, and Bears."[21]

Lewis and Clark write of the Elk: "They are common to every part of this country, as well the timbered lands as the plains, but are much more abundant in the former than in the latter."[22]

The great Basin between the Rockies and the coast range seems never to have been the home of the Wapiti, at least, I can find no records covering the region.

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[18]Expl. Lab. Pen., 1863, I, p. 224.
[19]Voyage, 1801, p. lxv.
[20]As above, p. 8.
[21]As above, p. 130.
[22]Hosmer ed., II, p. 177.

Primitive Abundance

The early accounts of travel in eastern America during the 16th, 17th, and 18th centuries abound with descriptions of the "great Stagge."

Among these early writers, we find frequent use of such terms as "immense bands," "great numbers," "great store," "covered with Stags," etc., etc., describing the abundance of the Wapiti.

In 1682, when La Salle marched westward to explore the Mississippi, he wrote of "the country between the lakes of the Illinois [Lake Michigan] and Lake Erie, for the space of 100 to 120 leagues. . . .

"There are also some dry prairies and some very good lands filled with an incredible number of Bears, Stags [Elk], Roes [Virginia Deer], and wild turkeys."[23]

Dr. B. S. Barton[24] writes: "Within the memory of many persons now living, the droves of Elks which used to frequent the salines west of the river Susquehanna in Pennsylvania, were so great that for 5 or 6 miles leading to the 'licks,' the paths of these animals were as large as many of the great public roads of our country. Eighty Elks have sometimes been seen in one herd upon their march to the salines."

As late as 1826, according to Colonel Parker of Cardeau, McKean Co., Pa., where he went hunting in northern Pennsylvania, "Elks were running in those woods in herds."[25]

J. D. Caton says[26] that according to Lieut. L. B. Carpenter, on the Lower Yellowstone River, he has quite recently (1877) seen Elk "in immense droves containing perhaps thousands."

On Sept. 20, 1901, I camped with John B. Goff in Lost Park, Colo. He told me that when he rode through there in 1888, he saw a band of 1,500 Elk. Now we saw not a single Deer or Elk. Yet the Elk were not all gone, for the previous spring in late March or early April, a band of 1,000 had been reported in Lost Park. This was told at the Nimrick Ranch. A young man, Mr. Steely, did not believe, and so came up to satisfy himself and counted 1,100 Elk. They were then in migration moving northward. They wintered on the lower divide between White and Bear rivers. Small bands were still to be found in most parts of the Forest Reserve, and some wintered near Sleepicat in the lower brakes along the south side. A few also wintered on Lost Creek.

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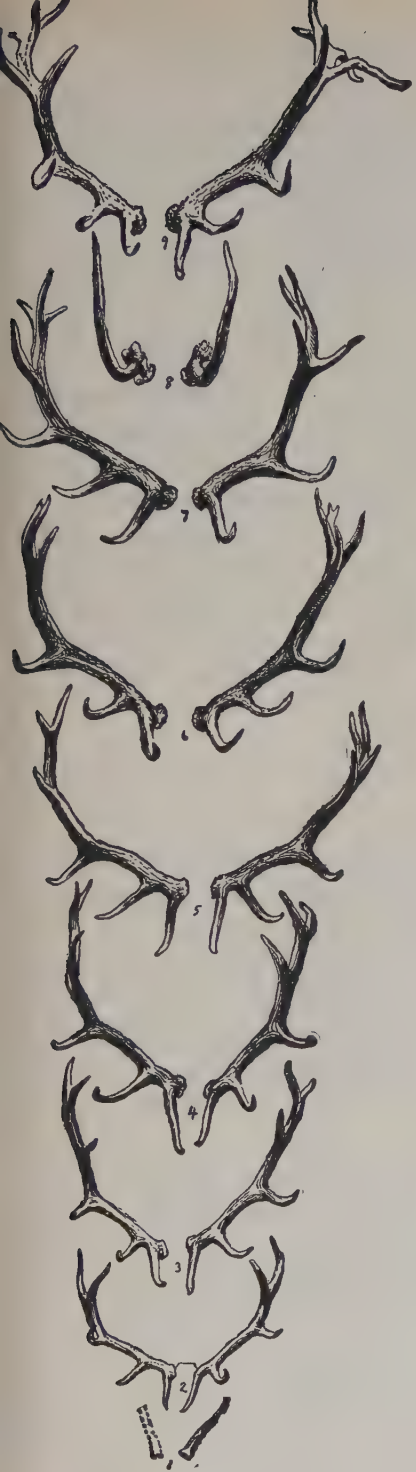
[23]Voy. de M. Cavalier de la Salle à la Rivière Missippi par le Père Allouez, par Pierre Margry, II, p. 97, Nov. 9, 1680.

[24]Med. & Phys. Journ., 1806, p. 46.

[25]N. Y. *Times*, reprinted in Pittsburgh *Post*, April 19, 1896.

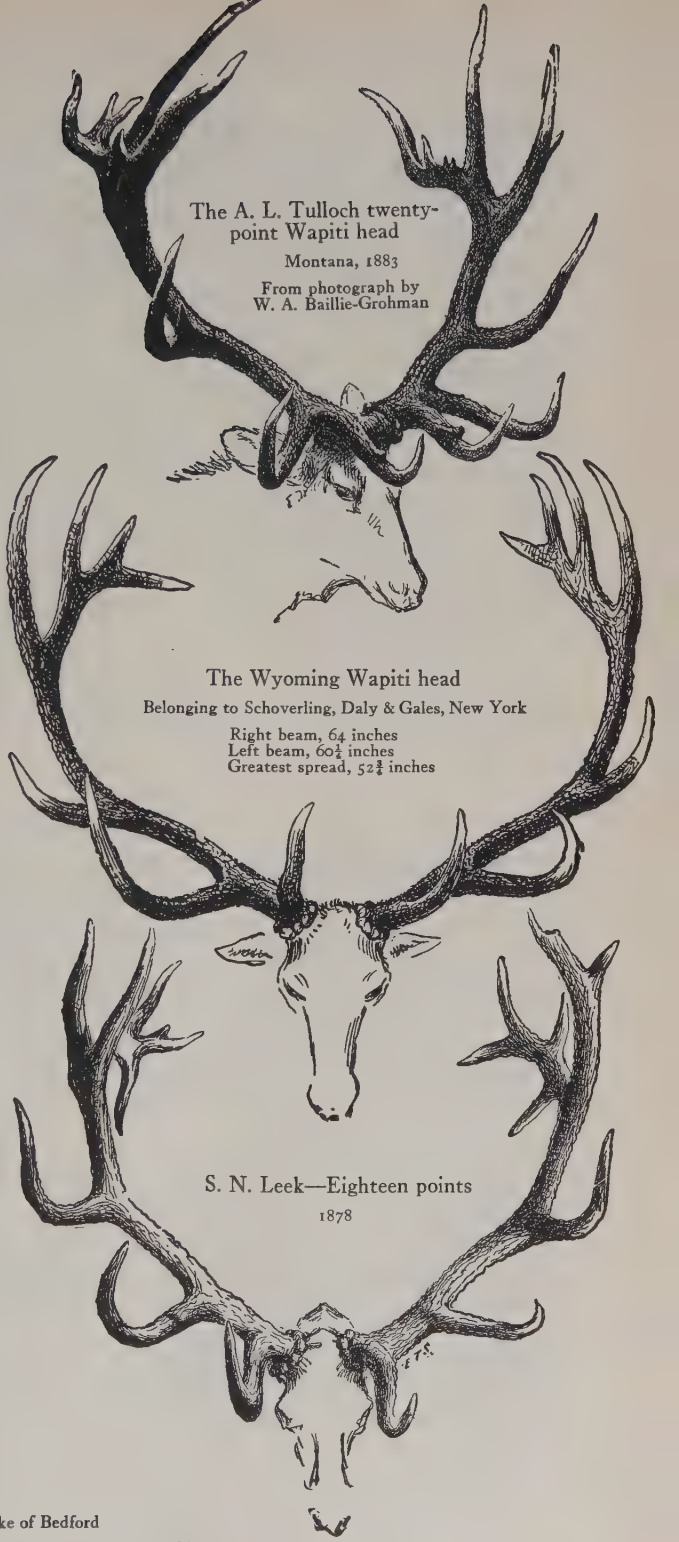
[26]Antelope, etc., p. 81.



The antlers of one Wapiti

From photograph supplied by His Grace the Duke of Bedford

ginning at the bottom this shows the successive sets of one Wapiti stag up to his
year. The first pair, the dags or spikes are grown in his second year—only one of
was found. The antlers increased up to the sixth or seventh pair (when the stag
n his seventh or eighth year). After that they began to go back, and the stag was
. This individual was kept in the park at Woburn Abbey.



The A. L. Tulloch twenty-point Wapiti head

Montana, 1883

From photograph by
W. A. Baillie-Grohman

The Wyoming Wapiti head

Belonging to Schoverling, Daly & Gales, New York

Right beam, 64 inches
Left beam, 60½ inches
Greatest spread, 52¾ inches

S. N. Leek—Eighteen points

1878

But how are we to get an idea of their actual numbers in those days?

When I was living in Yellowstone Park in 1897, I used all possible means to reach an estimate of the number of Wapiti it contained. The officials in charge agreed with me that there were fully 50,000 head. The actual park is 3,000 square miles, but the winter range of these herds includes Jackson's Hole and some other outside territory, which increases the total area to 5,000 square miles, or 10 Wapiti to the square mile. In this region, it is described as "abundant."

In early days, the total range of this species was about 2,500,000 square miles; that is, nearly, if not quite, equal to that of the Buffalo. By many processes of reasoning set forth later, I fixed on 50,000,000 as the probable number of Buffalo at the highest. The Elk seem to have been less abundant both in the East and in the West, for it is not mentioned by early travellers nearly so often as the Buffalo. The animal drive made in Pennsylvania in 1760 by Black Jack Schwartz, covering most of Snyder County, rounded up 111 Buffalo and but 2 Elk.[27] Over half of this vast range, it was by all accounts abundant. We are safe, therefore, in believing that in those days there may have been 10,000,000 head.

The Slaughter

The beginning of the 19th Century saw the Wapiti perfectly described, catalogued, and—started on the road to extermination. There are few stories of blood lust more disgusting than that detailing the slaughter of the great Elk bands. The Sea-otter were hunted down because their robes were valuable, and there was no avoidable waste. The Deer of New England were killed off for the meat. But the wholesale massacre of the Elk, like that of the Buffalo, was carried on for the joy of seeing the great creatures fall in dying agony; and, in later years, by tusk-hunters who were too lazy to be hide-hunters.

It was easier to kill Elk than Deer because they were less shy. They betrayed their whereabouts by whistling. They were easier to hit, and, in much of the range, could be pursued on horseback. They were more easily killed than Buffalo because, when alarmed, they ran not far; and one shot, well placed, would down the Elk. Thus, of the three, the Elk was the first to disappear in a given locality.

As a sample of the bloody work, I give the following:

"Oregon Game Hogs. Two years ago, there were a number of Elk on

[27]See Vol. I, p. 64.

the headwaters of Rogue River. Those who had seen the bunch, estimate that there were about 40 or 50, when the slaughter, of which I shall speak, took place. W—— was out, as usual, hide-hunting in the closed season; and in the deep snow, he saw where the Elk had passed. Going back to camp, he got what cartridges he had—75—and a little grub, and started in pursuit.

"He probably followed them several days, shooting whenever he got a chance. At any rate, he killed or crippled almost the entire bunch, only leaving the remnant when his 75 shots had been exhausted. What was left of the bunch, took refuge in an impenetrable fastness in the heart of the mountains, where even these hide-hunters dare not follow.

"Of the Elk, this fellow got only a few hides, as he did not stop to skin them when they fell, but pushed on after the main herd; and many crept off to die where he did not care to follow up. So were destroyed the only Elk in the Rogue River country."[28]

The Last Survivors

The last Elk killed in Pennsylvania is thus recorded by Dr. W. J. McKnight:

"Elk County, Pennsylvania, was erected in 1843, and was so named on account of its wilderness and great droves of Elks that formerly and then roamed in those wilds. This new county was composed entirely of the forest portions of Clearfield, Jefferson, Warren, and McKean Counties. In this territory were then about all the Elk of Pennsylvania, and the slaughter of them commenced in 1843 and continued annually until 1852. There was one Elk killed in 1862, one in 1866, reported as killed in 1869. The one reported as killed in 1874 was shot in Warren County in the 'thirties, and the horn trophies of this one were presented in 1846 to the Reynolds family of Meadville, Pa.

"The home of the Elk from 1843 to 1852 was Elk Mountain (now Boone), Elk Creek, Little Toby, Spring Creek, now called Hallton, Beech Bottom and Portland on the Clarion River, for protection from the light-footed Wolves. In winter, these animals always yarded on the Clarion. The reason the Elk lived on this river was that he was a great bather and enjoyed spending his summers on the bank, and on sultry days bathing in that river. Cattaraugus Indians and white hunters of New York State and our local hunters camped in that county every winter up to 1850 to hunt

[28]Burton L. Cunningham, Recreation, July, 1899, p. 37.

Elk. In the winter of 1852, a drove of 12 Elks yarded on the Clarion near Ridgway. Two Indians came in that winter from the Cattaraugus Reservation, and killed 7 of this drove. This was the last yard of Elks in Elk Co., Pa.

"Jim Jacobs, who killed the last Elk in November, 1867, was a full-blooded Seneca Indian, and a very intelligent man. He settled in Tunaguwant Valley in 1838, where the city of Bradford now is, and was living there in 1867, the year he killed the last Elk in the Clarion region and the last one killed in Pennsylvania."[29]

The vast herds of California Elk that roamed the open valley of the San Joaquin in 1850, were killed with unusual rapidity because they could be followed on horseback. In 9 short years, the Elk had become so scarce that individuals were followed for days till secured. A sad proof of this is furnished by the following item in the Stockton *Argus*, Oct. 25, 1859:

"An Elk weighing some 425 pounds was brought to Stockton on the 25th October from Middle River, where it was killed on Saturday last by Robert Dykman, the hunter, to whose superior skill with the rifle we are indebted for the larger portion of game of this description that finds its way into our market. Mr. Dykman was three days upon the trail, in which time he followed his game from near the mouth of the Mokelumne, across the San Joaquin and Middle River, a distance of about 35 miles."

In the wooded mountains of the north, they lingered longer. M. Hall McAllister writes: "I saw the last 2 Elk that were killed in this district; one a female, killed by John Burchard in 1872, the other killed by Bob Melson, in 1873. The horns of the latter were placed in the Sisson Tavern office. These were, I believe, the last 2 Elk seen in this country."[30]

"The region to the west of Scott Valley, known as the Marble Mountain country, was, up to 1880, teeming with game, especially Elk. One evening in 1876, a party of us were camped at Elk Lake, when a drove of Elk, numbering over 75 (that many were counted), came down the opposite hillside to the lake. Two were killed. The last Elk disappeared from that region about 1881.[31]

"John M. Punnett, a civil engineer of San Francisco, who has recently returned from the Pitt River, Shasta County, where he has been in camp with a survey party, reports that in the latter part of November, 1918, a small herd of Elk were seen on the mountain-side on the north bank of the Pitt River. They were observed by all the members of the party consisting

[29]Forest & Stream, Mar. 7, 1914, p. 306.
[30]William Russell, Cal. F. & G., July, 1916, p. 124.
[31]A. E. Doney, Cal. F. & G., July, 1916, p. 123.

of 5 men. . . . The consensus of opinion was that the herd consisted of 1 bull and either 4 or 5 cows."[32]

Frederic Irland, of Washington, D. C., writes me (Oct. 16, 1906) concerning the lake and forest tract about his summer home in Crawford County, in the northern part of the Lower Peninsula of Michigan: "A number of old Elk horns have been fished out of the waters of these lakes, lying partly covered with the sand, etc., of the bottom. . . . The last Elk killed in the county, so far as I am able to learn, was shot in 1895; and they have not been common there for many years—not within the recollection of living men."

Restoration in the East

The Adirondacks Mountain Park has been restocked chiefly through the efforts of a private "Society for Restoration of the Moose, the Wapiti, and the Beaver to the Adirondacks."

The energetic secretary, Harry V. Radford, has sent me the following particulars:

"The first liberations occurred in June, 1901, when 22 Wapiti, donated to the State by the late William C. Whitney—a vice-president of the Restoring Association—were released on State land nearRaquette Lake. Whitney donated additional Wapiti in 1902 and 1903, his total gifts to the State reaching nearly 90. The Park Commissioners of the City of Binghamton, N. Y., contributed 5 Wapiti in 1903, and this spring (March, 1906) we obtained from Austin Corbin 26 Wapiti, which were successfully released under the supervision of State officials.

"The latest estimate of the Commission (Sept., 1905) placed the number of wild Wapiti in the Adirondacks at 250. Add to this number Corbin's donation and the natural increase since, and the number of Adirondack Wapiti at the present time, Feb. 11, 1907, is close upon 400, and rapidly increasing. These are widely distributed, and seem to thrive even better than the native Deer. Additional donations are expected, and a few more years ought to complete the restoration of the Wapiti."

Michigan. George A. True, of Vanderbilt, Mich., writes me June 15, 1920: "We have a few Elk here. We first noticed them two years ago. I saw two quite near the club (Fontinalis Club). The keeper afterwards saw a group of 5 or 6. No one knows where they came from, as the State is not understood to be importing them. Possibly they were brought in by Sheep ranchers. They were around part of last season, then went over to the Pigeon River valley. To-day, I noticed tracks on our stream again

[32]Cal. F. & G., April, 1919, p. 98.

about a mile from the club; also near the Sturgeon River, where there had evidently been a bull 'scrap,' as the ground was well torn up. They ought to thrive here if let alone. They are supposed to be protected in this State. There are some Deer here."

"*Wild New Hampshire Elk.* A few years since, a small bunch of Wapiti or Elk were turned out, we believe, on Ragged Mountain, in the town of Andover, N. H. These are said to have increased, and now to number 50, although there are people who declare that the number is 100 or even 200."[33]

The California Elk

When the great herds of the San Joaquin Valley and foothills adjoining were destroyed by the market hunters, a remnant, a few pairs, took refuge in the willows and tulé beds near Buena Vista Lake in the southern part of San Joaquin Valley. This was on the ranch of the Miller & Lux Cattle Company. Henry Miller protected the Elk so that, while elsewhere they totally disappeared, there were on his range in 1914 probably over 400—the sole survivors of the dwarf Elk of California.

In 1914, Miller & Lux, through the California Academy of Science, distributed about 100 to parks and preserves that had suitable lands, and wished to propagate the species.[34] This is fully set forth by Dr. B. W. Evermann.

Since then, many other small bands of this race have been captured and distributed in the State.

In addition to the dwarf Elk reintroduced in various regions of the State, California has a form of the big Mountain Elk. The following are believed to be survivors of this northern race.

"There is a band of 7 Elk on the Scott River District of the Klamath Forest, while this is only an increase of 2 over the number reported last year, it is believed these Elk are now doing well, and will increase in numbers more rapidly in future years."[35]

Census of Elk in Recent Times

As we have already seen, my estimate of Elk in North America in primitive times was 10,000,000.

Dr. A. K. Fisher, of the Biological Survey, states that between 1885 and 1910, the game has decreased by more than 80 per cent.[36]

[33]Forest & Stream, March 5, 1910, p. 376.
[34]California Fish & Game for April, 1916, p. 70, etc.
[35]Cal. F. & G., July, 1922, p. 192.
[36]Forest & Stream, Nov., 1918, p. 563.

George A. Clark, Colorado
1895

Carter Collection, Colorado
Egeria Park, 1894

Carter Collection, Colorado
Egeria Park, 1877

Colorado, 1900. W. R. McFadden

Three-horned Manitoba head
F. W. Stobart, January, 1887

The J. C. Phillips twenty-nine point head
The record Elk for points

PLATE III.—FREAK ANTLERS OF ELK

In 1907, I used all available data, and estimated the number as follows:

Yellowstone Park	20,000
Wyoming, outside the Park	5,000
Manitoba	5,000
Idaho	5,000
Montana	4,000
Vancouver Island	2,000
Washington	1,500
Alberta	1,000
Saskatchewan	500
Oregon	200
California	200
British Columbia	200
Minnesota	50
In various Zoos, Parks, etc.	1,000
Total in 1907	45,650

I think now that this estimate was much too low. There may have been 100,000 at that time; and Fisher's guess that this was but 20 per cent. gives the 1885 population at possibly 500,000.

Henry W. Henshaw, of the Biological Survey, wrote in 1912: "In coöperation with the Forest Service, a census was made of the Elk just before they left their winter feeding grounds, and it was estimated that about 17,260 wintered in Jackson Hole and vicinity this season. The total loss was 716, and of the survivors 1,700 were calves.

"At the request of the Department, a similar census was made by the Superintendent of the Yellowstone National Park, and the total number which wintered in the northern part of the Park and along the northern boundary was found to be about 30,100. These figures show that the total number of Elk in Jackson Hole and the Park is in reality less than 50,000."[37]

We are officially informed that in 1919 "there are probably about 70,000 Elk in the United States. The largest herds are in the Yellowstone National Park and the surrounding national forests. Other important herds are the Sun River herds of some 2,500 Elk in the Lewis and Clark National Forest of Montana; the Olympic herds of Roosevelt Elk, comprising some 7,000 head in the Olympic National Forest of Washington; 1,750 in the White River, 800 in the Battlement, and 500 in the Gunnison National Forests, Colorado; 200 in the Boise National Forest, Idaho; and the small herds of the Selway

[37]Rep. Chief Biol. Surv., 1912, p. 19.

PLATE V.—ELK APPROACHING TO ATTACK
(IN A PARK)
Photograph by E. T. Seton

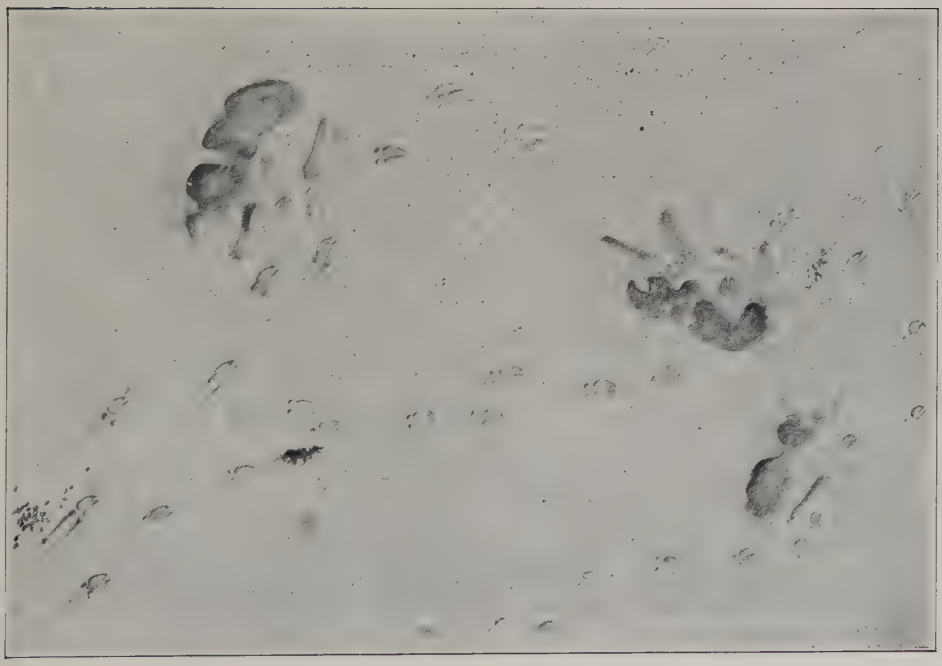


PLATE VI.—TRACKS OF BULL, COW, AND CALF ELK IN SNOW

PLATE VII.—ELK IN WINTER, JACKSON HOLE
Photograph by Steve N. Leek

PLATE VIII.—ELK LEAVING YELLOWSTONE PARK
Photograph by Steve N. Leek

and Clearwater National Forests, Idaho, aggregating a total of about 13,500 animals.

"In addition, small native herds, or herds built up by restocking and aggregating each from 25 to 500 animals, are found in many other national forests and parks, as the Colorado, Pike, Durango, Leadville, Sopris, Rio Grande, Cochitopa, Routt, and Arapaho in Colorado; the Black Hills, in South Dakota; the Big Horn, Shoshone, Bridger, Washakie, Medicine Bow, and Wyoming in Wyoming; the Mount Pisgah in North Carolina; the Cache, Caribou, Challis, Idaho, Minidoka, Payette, Salmon, Sawtooth, Targhee, and Weiser in Idaho; the Fish Lake in Utah; the Wallowa and Rainier in Washington; the Oregon, Siskiyou, and Suislaw in Oregon; the Sitgreaves in Arizona; the Wichita in Oklahoma; and elsewhere.

"In addition, there are a number of small private herds on large estates, including several in the East."[38]

In 1915, Col. Lloyd M. Brett in his Annual Report on the Yellowstone Park, set the number of Elk at 35,209.

Then came a succession of fearful winters with deep snow that drove the Elk into hostile regions where hunger and hunters killed them by thousands.

Dr. T. S. Palmer gives the Elk population of the United States at 72,000 in 1918.[39]

[38]Our National Elk Herds, by Graves and Nelson, 1919, p. 4.

[39]Game as a National Resource, U. S. Dept. Agri. Bull., 1049, 1920, p. 24.

Elk in the National Forests

Census by the U. S. Forestry Bureau

	1921	1922
Alabama	—	—
Arizona	302	445
Arkansas	—	—
California	79	74
Colorado	6,216	5,809
Florida	—	—
Idaho	2,308	3,081
Michigan	—	—
Minnesota	—	—
Montana	11,824	12,215
Nevada	—	—
New Hampshire	—	—
New Mexico	30	25
Nevada	—	—
North Carolina	16	19
Oklahoma	125	150
Oregon	2,368	2,825
South Dakota	650	780
Tennessee	—	—
Utah	880	1,031
Virginia	54	60
Washington	7,485	7,795
West Virginia	—	—
Wyoming	20,367	14,191
Total	52,704	48,500

In April, 1925, the actual count gave a total of 17,242 Elk in the Yellowstone Park.[40] This, however, takes no account of the Southern Yellowstone herd or the Teton National Forest herd. Including these, E. A. Goldman writes me that "the total number at present in and about the Park may be placed at over 40,000 head."[41]

The Yellowstone herds are now being drawn on to restock regions in which the native Elk have been exterminated, in nearly every State of the Union.

[40]Nature Notes from Yellowstone Park, April 29, 1925, by Ed. J. Sawyer, p. 3.
[41]Letter, May 15, 1926.

Elk in Canada

I learn from Col. H. I. Stevenson, Forest Inspector for Manitoba, that in the Riding Mountain, there are about 2,500 Elk; in Duck Mountain, 100 to 150; and a few scattered in the woods adjoining. "There are not more than 3,000 Elk in Manitoba. . . . I do not think they are increasing."[42]

In Saskatchewan for 1925, Game Commissioner F. Bradshaw estimates the Elk at about 5,000 and steadily increasing.[43]

In Alberta, according to Game Commissioner Benjamin Lawton, there are about 500 Elk,[44] besides which there are, according to Maxwell Graham, in the National Parks of that province 2,883 Elk

Information supplied[45] by M. B. Jackson of the Game Conservation Board, B. C., shows that in the East Kootenai District are Elk estimated at 6,000, and in the Bridge River District about 75.

In Vancouver Island are 3 bands, numbering 300, 150 to 200, and 50 to 100.

In Quebec, there are no Elk except possibly along the Ottawa, where there may be a few that have strayed from Algonquin Park.

The only Elk in Ontario are confined to Algonquin Park. Of these there may be about 100, but no exact figures are at hand.

Thus, the total Elk population of Canada now is 18,000.

Summary of Present Numbers

In a paragraph, then, the Elk in Yellowstone Park have dropped from 50,000 to 40,000, but the herds in the United States outside have increased to 32,000. Add to these, the Canadian quota of 18,000, and we have a total Elk census to-day of 90,000.

The New Thought

The dwindling process went on everywhere till about 1895. That was the low-ebb year in many parts of America for many kinds of game, but it was also the year of the great awakening. The lesson of the vanished Buffalo had sunk deep in men's minds. Thinking people everywhere recognized that, unless the methods then practiced were stopped, all our fine game animals would go the way of the Buffalo. They saw, too, that there was nothing to gain by extermination, and much to lose. Game protective

[42]Letter, Mar. 13, 1926.
[43]Personal letter, Dec. 12, 1925.
[44]Personal letter, Dec. 15, 1925.
[45]Personal letter, Mar. 16, 1926.

societies, founded in various parts of America by men who viewed with horror the approaching desolation of the wilds, have now secured sound legislation for the protection of harmless wild animals; and public sentiment has secured a rigorous enforcement of these new laws. Thus, in many regions, the process of extermination has been stopped.

And not only has an end been put to extirpatory hunting, but the awakening has found its logical climax in serious efforts to restock many of the deserted ranges. Several areas whence the species had long disappeared have been repeopled with Wapiti.

During the past 20 years, the number in Wyoming has decreased. On the other hand, in all regions where adequate protection has been accorded, the number has increased; and there can be no doubt that, with a system of permanent safe havens, proper limitation of bags, and an absolute prohibition of repeating rifles and of the sale of game, we may keep these fine animals with us as long as we have wild land for them to range on—that is, for ever.

Rate of Increase

Steve N. Leek, with a lifetime of experience among Elk, estimates the annual increase under ordinary circumstances at but 10 per cent.[46] This doubtless means in the region of Jackson Hole where limited food and deep snow take fearful toll. In happier circumstances, a much greater increase is possible, as evidenced by the 11 Elk (2 ♂ 9 ♀) which George Shiras 3rd put on Grand Isle, Lake Superior, in 1900. In 10 years, the herd numbered 250, showing an increase of about 33 per cent. per annum. This island has 14,000 acres, and has much other game, including 3,000 or 4,000 Deer. The weather conditions are trying, as they have fierce frosts and deep snow. But the food supply is good, and the protection from hunters and wild animals complete.

These two represent extremes. Ordinarily, "the increase of Elk under domestication is equal to that of Cattle. Fully 90 per cent. of the females produce healthy young."[47]

Home Range

The Elk makes a well-marked migration. Therefore, it has two home ranges—one for summer and one for winter. These seem to be much larger than those of the Moose, for the Elk travels freely at all times, and may

[46]Collier's The Problems of the Elk, Feb. 11, 1911, p. 22.

[47]D. E. Lantz, Deer Farming in the U. S. Dept. Agri. Bull. 330, 1908, p. 10.

roam over a 10-mile stretch, either in summer or winter, when unhampered by bad footing or snow.

Some idea of an Elk's requirement is offered in the following from the pen of George W. Russ of Eureka Springs, Ark. He long kept Elk in parks, and in 1909, had a herd of 93. To the question: How many acres of forest land per Elk are needed for best results? he replies as follows:

"Much depends upon the character of the forest land. In this section of the Ozark Mountains, an average of 5 acres to the head. In other sections, a larger area will be necessary. The larger the area, the better the results. One hundred Elk will fare better in a 500-acre enclosure than 1 Elk confined on 5 acres."[48]

Antlers

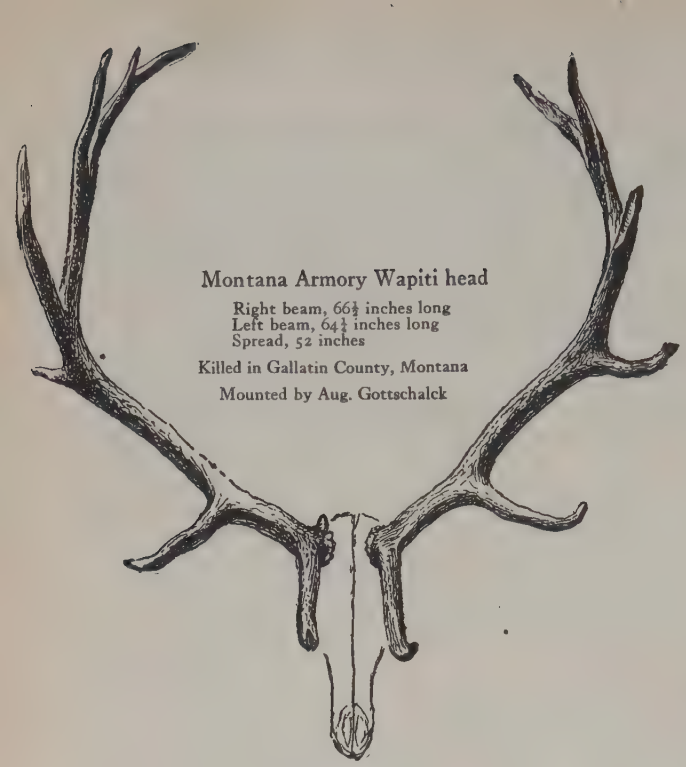
The crowning glory of the stag is his antlers; and the Wapiti, the finest stag in the world, has antlers befitting his size and dignity.

While the cows among the mountain valleys devote all summer to the calves, the bulls, at a much higher elevation, above the torment of heat and flies, have consecrated their entire energies to the growing of new antlers. If it were not like arguing in an egg-and-chicken circle, we might claim that the production of these antlers is the whole end and aim of the Wapiti's existence. Their growth is one of the miracles of nature that we never cease to consider a miracle.

About the end of the winter—that is, in mid-March, or, according to an enthusiastic Hibernian, always on the 17th of March, which is St. Patrick's Day—the antlers of the year before break off flush with their bony base, which sticks up an inch or more above the skull. Frequently they are found lying close together, showing that they fall nearly at the same time.

At first, the place of each antler is a broad raw spot. A few days later, it shows a thick rounded pad of blood-gorged skin. This swells rapidly and, in a fortnight, the great, bulbous, fuzzy young antler-beginning has shot up to a height of several inches. At exactly the right time and place, and in just the right direction, a bump comes forth to be the foundation of the brow tine. In a few days, the bez-tine is projected by the invisible architect. In a month, the structure is nearly a foot high, and all enveloped in a turgid mass of feverish, throbbing blood-vessels—the scaffolding and workmen of this wonderful structure. Night and day, the work is pushed with astounding speed, and in four months this "skyscraper" is finished. A marvel indeed; an edifice that, according to ordinary rules, should have taken a lifetime, and yet it has been rushed through in a single summer.

[48]Lantz, Raising Deer, U. S. Dept. Agri. Bull. 36, 1910, p. 34.

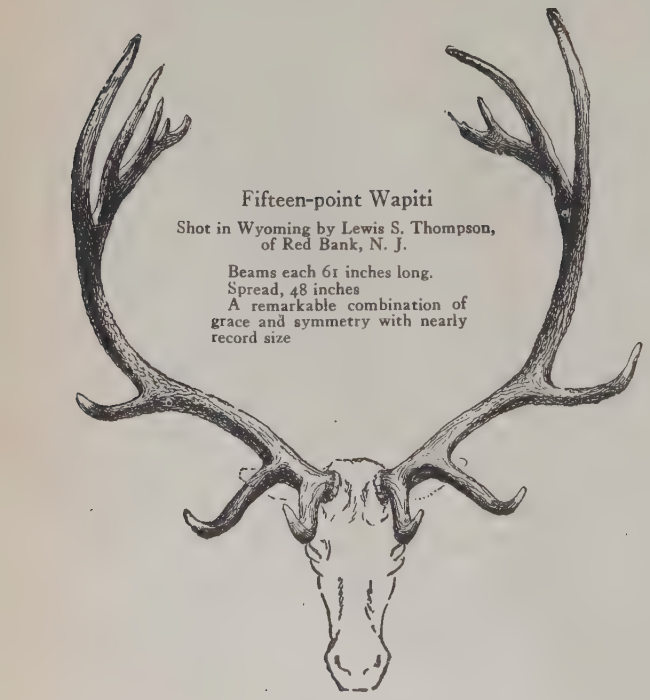


Montana Armory Wapiti head

Right beam, 66⅛ inches long
Left beam, 64⅛ inches long
Spread, 52 inches

Killed in Gallatin County, Montana

Mounted by Aug. Gottschalck



Fifteen-point Wapiti

Shot in Wyoming by Lewis S. Thompson, of Red Bank, N. J.

Beams each 61 inches long.
Spread, 48 inches
A remarkable combination of grace and symmetry with nearly record size

Cow Elk with horns, in Jardin des Plante

PLATE IV.—ANTLERS OF COW ELK AND OF RECORD BULLS

August sees the building done, but it is still cluttered with scaffolding. The supplies of blood at the base are now reduced. But the antler is still in vital touch with the animal; it begins to die when the process of peeling is begun. The sensitiveness leaves each part, the velvet covering soon dries, cracks, and peels, and the stag assists the process of clearing off the skin by scraping his new antlers on the brushwood. September sees him fully armed in his sharp bone spears, strong in body, glorying in his weapons and his strength, and ready to battle with all comers.

Those who have studied the Washington Monument will remember the dark weather-mark which came when the Civil War stopped the growth of the structure for a time. They will recognize the signs of slow growth at the massive base, the stones contributed by the various States, when their reverent patriotism was roused, and the less eventful ending as the point was reached. In the same way, the stag's antlers are a record of the life that grew them. They were brought forth in fever heat and produced with a rush at enormous cost, straining all the bodily resources for a time. The faintest slacking of the supplies, an excess of antler material in the food, the slightest weakening of the heart that is backing the enterprise, an injury to the sexual organs that inspired it, or any hurt on the growing antler, a cold, an attack of indigestion, is reflected at once in the structure that is a-building. The most vigorous constitution produces the best antlers. A stag too young or too old produces antlers which are below standard. All antlers are a reflex of the owner's vicissitudes while he was growing them. What wonder, then, that no two antlers are alike! The thousand different haps have produced a thousand different types. Most of these must be accepted as strange instances due to unexplained causes; "freak horns," the hunters call them. They are beyond our present comprehension.

Through the kindness of His Grace the Duke of Bedford, I am enabled to show a series of antlers—the successive growths of one bull Wapiti that lived in the park at Woburn Abbey.

The second of the spikes grown in his second year was never found, but it was very small. The two switches (No. 8 in the series) were grown in a year of sickness. The stag was weak and ill without known cause, and shed, not only his horns, but the two large hoofs of each foot, going sore-footed for weeks. The small hind hoofs, however, were not shed. In his tenth year, the stag was evidently on the decline, so he was killed for the museum.

Freak Antlers

Some freak antlers are shown in Plate III. One of the most remarkable cases is the finding of three antlers on one head. Occasionally

does (or "cows" as they are called) are found with rudimentary antlers. In the Jardin des Plantes is a doe Wapiti that grows two antlers each year on one side of her head (Fig. 8).

In one case, I found a bull Elk with three distinct antlers.

Stags of the European Red-deer are sometimes found permanently hornless. They are called "Hummels." I have not heard of any such among the Wapiti, but expect that they will be discovered.

Record Heads

The highly developed antler, however, is the most interesting. The typical form is shown in the Plate. Keeping this general symmetry, additional points are scored for additional size, aggregate length of beams and tines, number of points, weight, beading, and colour.

The antlers are second class if they are under 55 inches in length of main beam, following the curves.

The largest Rocky Mountain head of which I can find record is in possession of the Montana Armory. It is known as the 21-point head. I have not seen it, but the beams are said to be $66\frac{1}{2}$ and $54\frac{1}{4}$ in. long, respectively, and the spread 52 in. (Fig. 6.)

In Rowland Ward's Book (1922 edition) are listed 10 antler sets of 60 in. or more (Ward's measurements), besides 6 of the owners' measurements. Of these, the longest is the Wyoming head owned by J. Darley, and measured by him as follows: Length, 66 in.; widest outside, 60 in.; points 6 and 6.

Next comes the head in Sir Edmund G. Loder's collection. It is given as: Length, $64\frac{1}{2}$ in.; girth, 8 in.; tip to tip, $31\frac{1}{2}$ in.; widest inside, 45 in.; widest outside, 52 in.; points 7 and 6 (Ward's measurements).

Close to this comes the Schoverling, Daly & Gales head of New York, from Laramie Plains, Wyo. This is the largest I have measured. It is as follows: Right beam, 64 in.; left, $60\frac{1}{4}$ in. Ward gives the following additional particulars: Girth between bez and trez tines, $7\frac{5}{8}$ in.; widest outside, 40 in., points 7 and 7.

A 61-in. pair shot in Wyoming by Lewis S. Thompson, of Red Bank, N. J., is near the first place in size, as well as in symmetry (Fig. 7).

A fine 18-point head is shown in Fig. 5. I saw it in the possession of Steve N. Leek, of Jackson Hole, Wyo., where it was killed in 1896.

The 29-point head in the collection of J. C. Phillips is a remarkable freak rather than a beautiful example.

Most judges give the palm for beauty to a superb 20-point head shown by A. L. Tulloch at the American Trophy Exhibition at London, 1898 (Fig. 3). Its size and points have been exceeded, but its massive beams, perfect

symmetry, and wonderful pearling are so far unrivalled. The animal was killed in Montana in 1883.

What becomes of these wonderful growths? Why is not the forest littered with them, since they are dropped and renewed each year?

First, the forest *is* littered with them to some extent in districts where the Elk abound. In several parts of the West I have seen small garden fences made of the cast-off antlers, and I am told that in California it was common to see a rotted survey stake replaced by a pile of Elk horns, which were the handiest and most abundant substitute. But still, their numbers are nothing compared with what one might expect.

If they were as durable as stones, they would be as plentiful as stones in an ordinary Montana valley. The explanation is that they are easily destroyed by the elements, and are habitually preyed on by Mice and other rodents. In all the thousands of shed Elk horns that I have picked up or seen in the West, I do not think I ever saw one that was not more or less gnawed by Mice, Rats, Squirrels, or Porcupines.

The skull of the Elk may resist the weather for twenty years, the horns may crumble in half that time. As Caton long ago showed,[49] while bone is one third animal matter or gelatine, the antler substance is "about 39 parts of animal matter and 61 parts of earthy matter, of the same kind and proportions as is found in common bone"; besides which, the inner structure of the antler is exceedingly porous or cellular. "Soon ripe, soon rotten" is a north of England proverb that has a bearing on this case.

Effects of Castration

Judge Caton, whose work on the American Deer is the standard authority, made many experiments and observations on the effects of castration. The antlers were the parts chiefly modified by the after-effects of the operation. His summing-up is as follows:

"If a Deer be castrated at any time after the antlers are so far matured that their velvet may be removed without material injury, and while they still firmly occupy their seat, they will *invariably* drop off within thirty days thereafter, though it may be months before the time when they would have been shed in the course of nature. In this case, and also when the operation is performed after the antlers are dropped naturally, in the spring following, when the new antlers on the perfect buck commence their growth, the same growth commences on the mutilated animal, and progresses to all external appearance the same as on the perfect animal till they have attained nearly

[49] Antelope, etc., p. 169.

the same size as those which were last cast off. If the buck be a young one with a spike antler, this will be a spike also of nearly the same length. If an old buck with five tines, these will be of nearly the same size as the former, with five tines also. These, however, never perfect their growth and never lose their velvet; but at the time the antlers on the perfect bucks lose the velvet, those on the mutilated bucks stop their growth, but a moderate circulation is kept up in the velvet, which remains warm to the touch, and so they continue stationary till the severe weather of winter freezes the antlers through down to or very near the burr, when by the application of some accidental force, they snap off within a half an inch or an inch of the burr, depending on the size of the antler.

"If we now examine the detached portion of an antler, we shall see that its entire body is loose and spongy, more condensed at the circumference than within, but has nowhere attained the consistency of hard bone, so as to close up the blood-vessels leading into it from the periosteum. The communication has been all the while kept up between the external and the internal circulation, as was the case during the period of growth of the antler on the perfect animal.

"These stumps of the antlers are carried till the next spring, when a new antler shoots out from the old stump not so large as its predecessor, and grows on in the same way and at the same rate as on the perfect animal, till those so far mature as to shed their velvet, when as before that on the mutilated animal stops its growth.

"In the meantime, the old stump has enlarged its diameter and put out large tubercles as if supplemental to the burr, which is also considerably enlarged. The new antler thus produced is not so large as the former, and if branched has less tines.

"And so this process goes on year after year, each succeeding antler being less in size and perfection than its predecessor, while the enlargement at the lower end becomes an exaggerated burr. This process of growth differs very considerably in different individuals of the same species. In some, in a few years, these stumps grow to an enormous size, covered all over with large tubercles, some of them amounting to shafts two or three inches long, which may be frozen and broken off in the winter, while neither may be so conspicuous as to be recognized as a beam. The whole of this irregular mass is ever covered with the fine, soft, glossy fur. These two large masses in the place of the antlers, covered all over with these rudimentary shafts, present a very curious and interesting appearance on the head of a Deer."[50]

Further details are given in the Blacktail Life.

[50]Antelope, etc., pp. 186–87.

Marriage Customs

The natural history of monogamy is an interesting subject that is receiving some attention. In a recent number of the *Contemporary Review*, Dr. Woods Hutchinson claims that, in the long run, a monogamous race will triumph over a polygamous one.[51] He might have gone further, and pointed out the facts that among birds, the Pigeons as a family, and among quadrupeds, the *Canidæ*, are considered among the most successful; that is, families which are spreading, and can hold their own against all rivals, including man; and that these two are strictly monogamous.

Theoretically, polygamy should be better for the race, since only the very finest males leave progeny. Judge Caton has recorded a curious case that sheds light on this.[52] Referring to Sultan, the great bull Wapiti that was monarch of the herd in his park for a longer time than any other, he says:

"At first his progeny were reasonably numerous, but during the last three years of his life, they gradually diminished from a dozen down to a single fawn in 1875, with about 25 females, more than half of which had previously produced fawns."

Though able to hold the harem by force, he was removed and replaced by a younger buck. The result was 12 fawns the next season, including one case of twins.

As the Elk is the most polygamous of all Deer in America (probably in the world), it is interesting to note that it is the first of the family to disappear before civilization. This may be due in part to its large size; but it is further remarkable that the most successful of all our Deer, the common Whitetail, is the least polygamous. In this connection, we may consider the question of leadership, that is, the rudiments of government.

There is a widespread idea that the big bull is, as a matter of course, the leader of the Wapiti herd. This is not the case. It is well to remember how the animals get their leader. They certainly do not have any formal election, but they have, instead, a sort of natural selection or process of elimination. This is the process: The individual in that band who can impress on the others that he is the *wise one*—the safe one to follow—eventually becomes the leader, and if there are any members of the band who do not wish to follow him, they have an obvious alternative—to go the other way. Thus the herd reaches unanimity.

Numberless observations show that this wise one is not the big bull, but

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[51] London, Oct., 1904, pp. 485–96.

[52] Antelope, etc., pp. 294–95.

almost invariably an *elderly female*. The big bull might drive them, but not lead them. She is the one that has impressed the others with the idea that she is safe to follow—that she will lead into no fool-traps; that she knows the best pastures and the best ways to them; that she has learned the salt-licks, and the watering places that are safe and open all around; that her eyes and ears are keen; and that she will take good care of herself and incidentally of the band. This female leadership is common to most, if not all, horned ruminants. One may ask, therefore, if it be not also a corollary of polygamy.

Mating and Breeding

In the October of 1898, I was staying at the Palette Ranch of A. A. Anderson near Four-Bears, Wyo. In a large enclosure, he had 4 Elk—2 bulls and 2 cows. All were in the third year—two years and 4 months old. The females were in full rut, ready for mating and solicitous of attention. The bulls were anxious to do their part, and seemed much excited, but were evidently too young to be of service. From this and other facts, it would seem that the females produce the first calf when three years old, and the males are a year later in achieving effective maturity.

Observations on this subject are much obscured by the confusion between "mating" and "breeding." Many writers use these as synonymous terms, whereas "mating" should mean only the time of sexual union, and "breeding" the time of producing the young or brood.

"Gestation in the Elk is from 249 to 262 days (average about 8½ months). . . . The female Elk does not have young until 3 or 4 years old, and usually produces but one calf at a time."[53]

Speaking of wild Elk, Preble says:

"About 75 per cent of Elk cows over 2 years old bear young. The majority of calves are born between the 25th of May and the middle of June. Nearly all of the testimony obtained on the subject is to the effect that only one calf is born at a time. A few thought that twins sometimes occur, but it seems probable that this opinion arose from the fact that a cow Elk is frequently followed by 2 calves during the summer, the extra one being the deserted or orphaned offspring of another cow. Many of the hunters had examined large numbers of female Elk with calf, and none of these ever found more than one fetus.

"The proportion of the sexes at birth is nearly even."[54]

Nevertheless, Caton says that the young females produce one fawn at a birth, and the old ones generally twins, and three are sometimes produced at

[53]Lantz, Raising Deer, p. 26.

[54]Cond. of Elk, p. 19.

a birth. The fact that in my grounds the females never, to my knowledge, have bred before 4 years old, and never, I think, more than two thirds of these have bred in any one year, and that twins are of very rare occurrence, certainly shows a sad degeneracy. The last summer, I saw three great fellows sucking a large doe at one time, and she bore their rough treatment with maternal resignation; but I suspect that one of them at least was a poacher on the others' preserves. Remember that all the Deer tribe have four active mammæ."[55]

Spring and Motherhood

The great haven of the Rocky Mountain Elk is in and around the Yellowstone Park. Thither, as the snow melts, the Elk bands wend their way from the lower winter range along the Snake River, and other Park-born streams.

The cows remain in the rich upper valleys, but the bulls go on, and form another social circle still higher up. The cows have important duties ere long. Some time in May or very early in June, the portlier ones wander severally from the herd into some quiet hollow, where are born the fawns or calves. For a few days (one or two, according to Caton) they are left concealed in the bushes after the manner of Deer,[56] though for a shorter time than with most other kinds. The mother lurks in the neighbourhood and comes to suckle them at times; no doubt as the pressure of milk gives notice, and this is adjusted to the needs of the young.

The Young

None can see them now without marvelling at their stillness. They feign to be logs, lumps, dead things; but all their pretty and lawful deceit is belied by the bright, unblinking eyes which take in every movement of whoever happens to find them. The white spots, so far from making the croucher conspicuous under the leaves, look like the dappling spots of sunlight glancing through foliage on a log or the ground below. They are, indeed, a valuable feature in protective colouration.

For some days, the calf is thus hidden; and even after it is old enough to follow the mother, she will hide it on the appearance of danger. How it is made to understand the danger—whether by signal from the mother or by sighting the menace—I have not been able to determine.

However, the following, by George H. Northrop, furnishes some helpful information. Writing of the Olympic Elk calves, he says: "Nature has

[55]Antelope, etc., p. 295.

[56]Antelope, etc., p. 294.

provided a wonderful protection for Elk young, helpless as they are, not only in the colour scheme, blending as it does with nature so perfectly as to deceive the most careful scrutiny, but in the scent as well. Mother Elk give off a very strong musky odour, and during the several days the calf remains bedded till he has strength to join and follow the herd, the place chosen by the shy and careful mother in some secluded quiet nook becomes filled with this scent. So much so, in fact, that when a cow, startled from the bedding ground, rushes away with never a look at her offspring, a Dog inexperienced will literally or actually jump over the bedded calf, following the strong scent of the mother. In fact, this works out so nicely that many hunters have said a calf gives off no scent.

"Young calves are easily caught and with little coaxing will follow one home, but when from 10 to 20 days old, can give you a merry time and put up a real fight. I once saw 5 calves at play startled by a Dog, when they immediately dropped to the ground as if shot, and lay flat. On walking over to them, I was able to stroke 3 from one position, while the other 2 were barely out of reach."[57]

I once saw a fawn that was born so late that on Oct. 15th he was still in his full spots. He was, in fact, not yet running with his mother, and must have been, therefore, less than a week old. I saw her come to feed him. After he had sucked as much as she thought proper, he teased her so that she ran away. He persisted in following, but she took refuge in a water-hole, standing where it was nearly three feet deep. He circled all round the edge, but did not dare to wet his feet.

When 3 or 4 days old, the calf begins to follow the mother. Thenceforth, they are inseparable, and her devotion to him is ideal, so far as her limited intelligence can make it so.

Late in June, on the Yellowstone, I saw the cow Elks in bands and the calves running with the mothers.

H. W. O. Bojer, the Brandon, Man., naturalist, tells me that in late August, 1902, he was on the Pembina River between Swan Lake and Grassy Marsh. A calf Elk was mired in the crossing of the river. The mother lingered around for two weeks in the near-by woods, dumbly sorrowing, but without the necessary wit to save her offspring. Bojer saw the mother, but not the calf.

"The calves are said to begin to graze at the age of 4 to 6 weeks, and many are weaned in September. In some cases, however, weaning does not occur until October, November, or even later."[58]

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[57]Forest & Stream, Jan., 1924, p. 29.

[58]Cond. of Elk, p. 19.

With the waning of summer, the drain on the mother becomes less; and as the pasturage is now rich and abundant, all become sleeker and fatter with every week, September finding them in perfect condition.

The spots on most of the calves are much faded, and, when their new coats come, with October, the spots usually disappear. Now the young are able to forage for themselves, though they may follow the mother for at least another six months.

Enemies

There can be little doubt that in primitive times, the Coyote, the Wolf, the Cougar, and the Bear were enemies that the Elk had to reckon with, although the adults were usually beyond danger of the attacks.

I have no definite account of Wolves attacking Elk, although Col. H. W. Shoemaker mentions many cases in his "Extinct Pennsylvania Animals," 1919.

My Bitterroot guide, Abe Leeds, related to me that he once followed the trail of a bull Elk and found that it had been followed also by a Mountain Lion. He came at length to the Elk bedded in the snow. It was a big fellow with fine antlers. On a log 30 yards away, he saw where the Lion had stood watching the Elk, but had evidently decided that he dared not attack such a formidable looking prey, and had sneaked off unwillingly to find an easier elsewhere.

During the January of 1914, I was in the Yellowstone Park with Henry Anderson, the hunter. He told me that the previous winter he had followed the trail of a Mountain Lion for 10 miles near Yancey's, and found that it had killed and cached 3 cow Elk. In each case, the Lion had dragged the body as much as 150 yards to a good cover, and there had hidden it with brush and snow. These caches serve as food supply if a famine come, but also they commonly fall to the share of the Coyotes.

The Bears, Black or Grizzly, can scarcely be a menace to the Elk, excepting to the calf when it is less than a week old, and hiding alone in some thicket. On finding it here, the Bear would no doubt kill and devour it. But at other times the Elk is safe from any such attack.

The attitude of the bull Wapiti is adequately sketched in the following from the pen of Mortimer Kerry, who, in the halcyon days of the early '70's, was privileged to see Bear and Elk in primitive assemblage. He says:

"In a contest with a Bear I once saw a magnificent male pierce Bruin through the body with its many-pronged antlers at one charge, and it did not quit its charging until the Bear ceased to breathe. With a proud mien, it then stamped on its adversary with the fore leg, and finding life extinct,

turned around and trotted off into the damp, dense forest. The contest was so interesting that I could not find it in my heart to shoot the noble-looking, victorious animal, so let it depart in peace."[59]

The Coyote is dangerous to the calf only, during the time when it is in hiding. Once the young is with the mother, it is adequately protected; and in some cases amply avenged.

Dan McCowan, the hunter-naturalist, has recorded a thrilling adventure in which a Coyote met his nemesis. He writes:

"Grim narratives and graphic portrayals of lone Elk, run to a standstill, brought to bay and slain by ravenous Wolves, are commonplace. Consider the situation reversed and imagine, if you can, a lone Prairie Wolf surrounded by Elk. Such an occurrence was witnessed in the Canadian Rockies only last January. Quietly encircling and then gradually closing in upon the hapless Coyote, the females of the herd trampled it to death and broke every bone in its gaunt body.

"Then, as if keen to share in the triumph over an ancient enemy, the antlered bulls tossed the limp carcass high in the air. When the herd moved away to shelter of the woods there remained on this mountain meadow the confused imprint of many hoofs in the snow, a few carmine stains and a pitiful furry thing that once had life and being."[60]

Insect Terrors

All of the foregoing are the largest of the Wapiti's natural enemies, and, therefore, probably, the least destructive.

The creatures that he really dreads are the living things with wings and stings, that assail him in baffling, irresistible millions, and drive him to the refuge of high hills, deep water, or armour made of mud.

J. K. Lord, writing of the wild life in the West (1866), says: "Travelling in Oregon, one constantly finds oneself on the banks of a wide glassy lake; gazing over its unrippled surface, the eye suddenly rests on what to the inexperienced in hunter's craft, appears to be small clumps of twisted branches, or dead and leafless tree-tops, the trunks of which are hidden in the water; but the Indian and trapper discerns in a second that the apparent branches are the antlers of a herd of Wapiti that has been driven into the water by Breeze flies (*Tabanus atratus*)."[61]

Another fearsome bogie is thus described by A. B. Champlain: "The common Wapiti . . . is the host of one of these flies, commonly called

[59]Forest & Stream, June 4, 1874, p. 257.

[60]Forest & Stream, Jan., 1926, p. 11.

[61]The Naturalist in Vancouver Island and British Columbia, 1866.

PLATE IX.—THE HOODOO ELK

PLATE X.—WOODLAND CARIBOU, MALE AND FEMALE

(*Rangifer caribou* (Gmelin))

the 'deer-tick.' It is remarkable that flies of the genus *Lipoptena*, to which the so-called 'deer-tick' belongs, have wings in the adult stage at first, by which means they hunt and attach themselves to animals where they remain. Having no further use for wings, they shed them."[62]

I find no record of ticks actually destroying their host by blood-sucking, but there is evidence, ever higher-piling, that these ticks reduce their victims vitally, and at the same time convey deadly disease, which destroys the creature that has no means of combatting these world-wide pests.

Snow the Murderer

But the deadliest enemy, after man, is snow, which, when it comes deep and continuing, hides their food, and brings the great Elk herds face to face with a hunger death.

During the terrible winter of 1910–11, the number of Elk which died of starvation in the Jackson Hole region was estimated at "some 2,000 to 2,500. Of these, by far the greater number were calves of the previous year. Probably 75 per cent. of the calves which came into the valley in November and December had perished of starvation before the end of the following March. In some bands, the loss of calves was as high as 90 per cent., but other bands suffered less. The greater part of the loss occurred before feeding began, but large numbers, both calves and older animals, were so weak that they died even when receiving what would ordinarily have been an abundance of food. Many, in fact, on being fed after a period of starvation, die almost immediately. There is little difference, evidently, in the relative mortality of the sexes in adult Elk, and out of 75 calves examined for sex, 32 were males and 43 females, indicating that, in the case of the young, the burden on the sexes is not strikingly unequal."[63]

Another melancholy evidence of overwhelming calamity is thus recorded by T. E. H [ofer]: "A few years ago, Capt. Geo. S. Anderson, then superintendent of the park, found one spring some thousands of dead Elk, and the same year, W. T. Hall, of Gardiner, counted in one morning 300 dead carcasses floating down the Yellowstone River. The Elk that died within reach of the morning rise of the river must have been very few by comparison with those dying away from the stream."[64]

It is comforting to know that energetic steps are being taken by the Government, State and Federal, as well as by game protective organiza-

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[62]Forest & Stream, May, 1923, p. 279.
[63]Cond. of Elk, Preble, p. 18.
[64]Forest & Stream, March 26, 1910, p. 492.

tions, to prevent a repetition of these fearful losses, by storing and supplying food to the snowbound herds, during times of stress.

Licks

Like all ruminants, maybe all herbivores, the Elk has need of periodic medication of the kind that is furnished by salty earths.

Long ago, John Bartram made his famous journey on horseback from his home on the Schuylkill River, northeasterly along the Susquehanna to the Cayuga branch. He set out July 3, 1743, and passed continually through country abounding in Elk.

On July 14th, he wrote concerning Elk licks: "The back parts of our country are full of these licking ponds. Some are of black sulphureous mud, some of pale clay; the Deer and Elks are fond of licking this clay, so that the pond becomes enlarged to a rood or half an acre; the soil, I suppose, contains some saline particles agreeable to the Deer, who come many miles to one of these places. There had been a great Elk there that morning."[65]

Wallows

In many parts of Colorado and Wyoming, during fall, I have seen soiling pits or earth wallows made by Wapiti. These are accredited to the bull. He is known, indeed, to wallow in them like a Hog, whether as an amusement or as an instinctive sanitary measure, is not ascertained. Goldman writes me that "females also wallow in summer, perhaps for relief from ticks and other insect pests."

Concerning the same habit in the Red-deer of Europe, J. G. Millais writes: "Park Deer make big wallows, which are mostly used by stags and hinds alike in spring to free their coats from the old hair, the *bain de marais* generally taking place at night."[66]

"Many Highland stags wallow in their peat baths at once [after cleaning] but the majority wait till the approach of the rutting season before taking the regular course of *bains de marais*."[67]

It is not known why these are made, nor whether they are made only by the males.

On Sept. 8, 1898, I was witness of a most interesting social function attended by a number of Wapiti. It was at a small upland lake in Jackson Hole, when, about 4 P.M., a band of Elk, 9 in all, came trotting from the woods, led by a cow, but with a bull bringing up the rear. They plunged

[65] Travels, 1751, p. 68.

[66] British Deer and Their Horns, 1897, p. 36.

[67] As above, p. 102.

into the water, and played there for some time, rolling, wallowing, splashing, and chasing each other. The scene was somewhat like a social bathing at a fashionable watering place. At last their game was ended by the discovery of my presence.

Strange Happenings

Judge W. N. Byers of Denver told me, Oct. 29, 1899, that not long before, there had been a travelling showman come to Denver with a couple of Elk, trained to jump from a scaffold 40 feet high into a tank of water. He first led the cow up the gangway. But she seemed very unwilling to leap. She kept putting out her tongue and twisting about, as though begging to be let off. After some minutes' persuasion, she took the leap, disappearing after she struck, but coming up at once and swimming to the landing. Her calf followed without hesitation.

The following suggestive passage by J. G. Millais may result in valuable observations on our Deer:

"Very often in a large enclosure, quite a young stag will isolate himself from the others. He is to be seen alone at all times, and makes his resting place and feeding ground apart from the rest. In the opinion of one who has kept Deer all his life, and is also a keen observer, stags which thus dissociate themselves from their fellows at an early age, invariably turn out first-class animals and probably the best in the place. He maintains that this early independence of character is a sure sign of future greatness."[68]

Fred C. Selous, while hunting on the South Fork of the Stinking Water in 1897, made a curious observation. A Wapiti, shot by a companion, rolled for some distance down a steep hill, and the party which went to cut it up "came on the body of a Mouse, which had evidently been killed and squashed flat by the sudden fall of the great stag."[69]

A singular occurrence is reported by Grizzly Adams. He says: "During this day, Sykesey had been busy at camp, jerking up the bountiful supply of Elk meat so as to dry it; and in the evening, upon my return from the traps, he told me a story which it was a little difficult at first to credit. He said, that in cutting up the heart of one of the Elks, he had found the stone-tip of an Indian arrow imbedded in its substance; making it appear that the weapon had been shot, and broken off some time before, and that the wound had afterwards healed, surrounding the stone with matter which was hard and callous. He had kept the heart, and now showed it to me; and, sure enough, there it was, with the stone imbedded. Without this

[68]British Deer and Their Horns, 1897, p. 36.
[69]Sport & Travel, East & West, Nov., 1900.

positive proof, it would have been hard to make me believe that any animal could have lived with such a stone in its heart; but two years afterwards, I killed a Deer in Corral Hollow in California, and found a small bullet in its heart, incased in very much the same manner as this stone was. So, from these two instances, it is certain that animals will sometimes live and get well, with wounded hearts."[70]

There are on record many similar cases among human beings. Of course, the wound was in each case in the muscular walls of the heart, and did not penetrate to the vital chamber; else there would have been a speedy finish.

The following has been put on record a number of times in different forms. It is well to suspend judgment. It is quite possible that the Elk in question was overcome by the nervous shock. The writer, G. W. R., of Montpelier, Vt., was out hunting with a friend in Teton Mountains, Wyo., in Dec., 1893. They got a chance at 4 Elk. "He took careful aim at the one nearest and fired. Both Elk fell at once. He ran to the first, cut its throat, then started for the other, but before he reached it, the Elk got up and came in the open, where I killed it. His shot had struck it in the shoulder and lodged there. We went back to the first Elk, and looked it over carefully for a bullet hole, but could find none. In quartering, and afterward in skinning the quarters as needed, we looked for a bullet hole, but there was none. We examined head and legs as carefully as any other part of the body, but could find no bullet hole anywhere.

"I have always thought the Elk was paralyzed with fear, and that before it recovered, my companion had cut its throat."[71]

The Hoodoo Elk

In the September of 1912, when out in Yellowstone Park with Tom Newcomb of Gardiner, I had this curious adventure, that I shall not try to explain. We had crossed the Yellowstone Lake in a motor boat, and were camped on the extreme southeast Finger, at a point twenty-five miles as the crow flies, and over fifty as the trail goes, from any human dwelling. We were in the least travelled and most primitive part of the Park. The animals here are absolutely in the wild condition, and there was no one in the region but ourselves.

On Friday, Sept. 6th, we sighted some Elk on the lake shore at sunrise, but could not get nearer than 200 yards, at which distance I took a

[70]Grizzly Adams, 1911 ed., pp. 126–27.

[71]Recreation, Aug., 1898, p. 120.

poor snap. The Elk wheeled and ran out of sight. I set off on foot with the guide about 8:30. We startled one or two Elk, but they were very wild, and I got no chance to photograph.

About 10:30, when several miles farther in the wilderness, we sighted a cow Elk standing in a meadow with a Coyote sneaking around about 100 yards away. "That's my Elk," I said, and we swung under cover. By keeping in a little pine woods, I got within 100 yards, taking picture No. 1. As she did not move, I said to Tom: "You stay here while I creep out to that sage brush, and I'll get a picture of her at 50 yards."

By crawling on my hands, I was able to do this, and got picture No. 2. Now I noticed a bank of tall grass some 30 yards from the cow, and as she was still quiet, I crawled to that, and got picture No. 3. She did not move, and I was near enough to see that she was dozing in a sun-bath. So I stood up and beckoned to Tom to come out of the woods at once. He came on, nearly speechless with amazement.

"What is the meaning of this?" he whispered. I replied calmly: "I told you I was a medicine man, perhaps you'll believe me now. Don't you see I've made Elk medicine, and got her hypnotized? Now I'm going to get up to about 20 yards and take her picture. While I do so, you use the second camera and take me in the act." So Tom took No. 4, while I was taking No. 5, and later No. 6.

"Now," I said, "let's go and talk to her." We walked up to within 10 yards. The Elk did not move, so I said: "Well, Bossy, you have callers. Won't you please look this way?" She did so, and I secured shot No. 7.

"Thank you," I said, "now be good enough to lie down." She did, and I took No. 8.

I went up and stroked her, so did Tom; then, giving her a nudge of my foot, I said: "Now stand up again and look away."

She rose up, giving me Nos. 9, 10, and 11.

"Thank you, Bossy, now you can go." And as she went off, I fired my last film, getting No. 12.

By this time, Tom had used up all his permissible words, and was falling back on the contraband kind to express his surging emotions. "What the —— is the —— meaning —— of this ——?" and so on.

I replied calmly: "Maybe you'll believe I have Elk medicine. Now show me a Moose and I'll give you some new shocks."

Our trip homeward occupied a couple of hours, during which I heard little from Tom but a snort or two of puzzlement.

As we neared camp, he turned on me suddenly, and said: "Now, Mr. Seton, what *is* the meaning of this? That wasn't a sick Elk, she was fat and

hearty. She wasn't poisoned or doped, 'cause there's no possibility of that. It wasn't a tame Elk, 'cause there ain't any, and, anyhow, we're 70 miles from a house. Now what is the meaning of it?"

I replied solemnly: "Tom, I don't know any more than you do. I was as much surprised as you were at everything but one, and that was when she lay down. I didn't tell her to lie down till I saw she was going to do it, or to get up either, or look the other way, and if you can explain the incident, you've got the field to yourself."

The Dance

The grand curious amusement of the Elk, one which several hunters have witnessed, may be called their "circle dance." H. W. Skinner, of Chicago, sends me his observations on this performance:

"About 4 o'clock one afternoon, late in August, 1890, I was riding northeast up a small stream flowing into one of the tributaries of the Green River, near its source in northwestern Wyoming. The intense heat was relieved only by an occasional faint breath of breeze from the north. My attention was attracted by a column of fine dark-brown dust rising ahead of me and on the opposite side of the creek (I was on the south side). The column of dust looked almost as if caused by a whirlwind. On reaching a point as close to it as I could get without crossing the creek—I was perhaps 100 yards from it—I found that it was caused by a band of Elk, numbering from 12 to 20, who seemed to be trotting quite rapidly, with occasional awkward galloping plunges, in a circle perhaps 30 feet in diameter. They were going in the same direction as the hands of a watch, in the edge of a little belt of second-growth timber—mainly, I think, quaking asp. They were moving, not with heads up, but with noses only a foot or two from the ground. My impression is that they were all bulls. Owing to the dense clouds of dust which occasional light puffs of wind blew almost toward me, I could not see very clearly. It seemed to me that they were running about as 'milling' Cattle do, except that I never knew of Cattle to mill in such a small bunch. I have related this incident several times to hunters and trappers, who could offer no explanation of it. There were large numbers of Elk in that country at the time, in bands of various sizes."

This remarkable exercise has no obvious relation either to the sexual instinct or to hygiene. A similar performance is noted in the Moose *Life*.

Immorality or Perverted Instincts

It is not surprising to find among animals some perverted instincts and morbid impulses of the kind that in man are called unnatural passions.

It is well known that Monkeys, Apes, and Baboons are very prone to sexual abuse when closely confined. Among the military stables in India, the stallions commonly indulge in sexual self-abuse. The habit, it seems, becomes epidemic in some stables; and it is sometimes necessary to tie a prickly bush against the Horse's belly to punish him and stop his attempt as soon as he begins to give free rein to his imagination.

Many cases have been observed of unnatural assortments in the poultry yard, as the peacock with the duck. And Mr. J. A. Ricker of Denver, Colo., has recently (1900) supplied me with some curious notes on a morbid attachment that sprang up between a bull and a steer out on a Cattle range of his State. The bull devoted all his time to this eunuch; made him the object of his approaches and lavished on him in futile effort all that was the natural right of the numerous cows about. This bull utterly neglected and ignored his proper duties as long as that steer was there. And it was some time after the steer was killed before he recovered his natural instincts sufficiently to address one of the cows.

A somewhat similar case was observed among the animals kept by Dick Rock of Buffalo fame. A bull Elk became enamoured of a female Horse. The feeling was reciprocated and indulged to an unnatural extent until the mare was removed. The Elk then formed a new attachment for a gelding who submitted to the bull with an expression of mixed indifference and amusement, as evidenced by photographs.

Tracks and Signs

As is usually the case with big game, one may be in a land abounding with Wapiti, and see nothing of them for long; but the hunter cannot fail to see, on every hand, the little telltale "signs."

During my hunting trip in the Shoshones, in October, 1898, I saw many Wapiti, or Elk, as they are there called, and got none at all. But I got what I went for—a lot of observations, and made the sketches and notes which are reproduced.

The Plate shows the tracks of three Elk, travelling in the general direction of "down wind." Here, H, I, I, crossing from the middle below out at the top left corner, is a stale track. Its size and general character, together with the place, show it to be that of a bull Elk. He was travelling toward I, because, in spite of its dimness, we can see a faint sharpness at one side of the track and a suggestion of squareness at the other, showing the toe and heel marks, respectively; and also because, on the bank, at the bottom, H, the tracks are shortened, showing that he was coming *up*.

In case of doubt, one can sometimes determine the direction of a track

by lightly brushing away the snow. The wet ground below may have a clearer impression, or a ball of hard snow may remain to tell the tale. The track is stale; but how stale? Yesterday the wind came from the point he is headed for, and last night came the fresh snow; therefore he is twenty-four hours ahead, and though unalarmed—witness his easy stride and trailing toes—it might take several hours to come up with the maker of that track.

But the three we are following are quite fresh. A is the track of a big bull, because the hoof-mark is 5 inches long (4 inches would be middle-sized). His hoofs might be overgrown, but the tracks are wide apart, showing the thick body. He has fine antlers, because the cow went through a 4-foot opening, which he avoided for a wider door. Also, the snow is knocked off the lower branches where he passed, and a spike-horn rarely touches a branch with his antlers.

That he is not alarmed is shown by his short steps and the lazy dragging of his toes, as well as by his *halting* (K) to drop an important hunter's sign. The track is fresh, because it was made since last night's snow, but it is at least an hour old, because the sign at K is no longer hot; is sprinkled, indeed, with hoar-frost.

Here, at B, the bull "bedded." He was there for an hour at least, because the snow under him is melted.

The trail C is that of a full-grown cow; a cow, because at L the creature had stopped and straddled (told by the hoof-marks LH LH) to leave the liquid sign; and full-grown, because the hoof-mark is 4 inches long.

Her trail shows no sign of alarm. At D she lay down, but rose up after she had been long enough to melt the snow—perhaps an hour; looked about with the usual watchfulness of a cow, as shown by the second mark, not quite tallying with the first.

The trail E is that of a calf of the year, born late in May, and not yet (October) quite weaned. He lay down by his mother. But see, each bed is still wet with melted snow, and the tracks that were a couple of hours old are now quite fresh. *We have jumped the three Elk.*

They sprang up when they heard us coming through the woods. See the long strides of the bull as he trotted off, no longer trailing his toes; see how all three fell into line! But what is this sign at J? That animal stayed to do something that all Deer do every few hours in cold weather, and nearly always on rising. She was not greatly alarmed (less so than the bull), or she would not have stayed, for the small quantity shows that she was not greatly pressed. Therefore we may yet see them for the Elk will swing around, probably to the left, as that is uphill, till they either see us or get our wind. Quick now—a rapid advance—keeping a sharp lookout—here we

PLATE XI.—REINDEER HALF-SHED—HORNS IN VELVET
Norway, July 8, 1900

PLATE XII.—SKETCHES OF A MAINE CARIBOU

PLATE XXII.—BARREN-GROUND CARIBOU ON THE SPRING MIGRATION

From photographs taken by J. B. Tyrrell, by permission

are at the edge of an open glade. And there across it, gazing toward us, are the Elk. For a moment, they stand, then up go their noses, and away they trot at speed, with the cow, as usual, in advance.

Dung

The dung of the Elk is in pellets that are round and hard in winter, when the food is largely dry grass and twigs, but soft, confluent, and bovine in spring and early summer when their food is chiefly green grass and vegetables.

An ordinary evacuation of a full-grown bull is about 300 pellets, or in quantity, 1½ pints.

Voice and Expression

Besides the bugling of the bull, the Wapiti makes several sounds that serve in expression—the snort of curiosity, the squeak of rage, the hankering whine of desire, or of concern often exchanged by cows and calves after becoming separated by chance.

Usually, under excitement, the hairs of the rump patch are raised and displayed as in most Deer. The following note is from my Journal for October, 1900:

The old cow Elk with the newborn calf in the Park at Richmond, Va., threatened a Dog that came near by grinning and showing her tusks. Her mane did not bristle nor did her disc hair rise. This showing of the tusks seems to indicate that an ancestor at one time had functionary tusks, possibly like those of the Muskdeer.

The bull Elk, like most ruminants, has an elaborate fashion of smelling the urine or genitals of the other sex, then raising his head high in the air, and exposing his teeth in an exaggerated grimace.

Speed

The ordinary speed gait of the Elk is a trot. Under the stimulus of extreme fear or fury, the creature may run. "But it is a laboured effort, and soon tires him out."[72]

"When chasing a Dog in the grounds, or when pursuing each other in animosity, they always run. The Elk is undoubtedly a natural trotter, and Colonel Dodge says: 'I believe an Elk will trot across ordinary prairie at the rate of about a mile in 3 minutes 30 seconds.' There is, however, about the same difference in speed among Elk as among Horses."[73]

[72]Col. R. I. Dodge, Hunting Grounds of the Great West, 1878, p. 164.

[73]Antelope, etc., p. 275.

His Autumn Way of Life

If the antler is the life aim of the bull Wapiti, and the sole end of the antler is the battle, then is the autumn in his years of perfect prime the crowning epoch of the great stag's life. Then from the mountain, whither he retired last spring, he descends to the level of the cows. In the end of August he comes, and the rut begins. It is at its height from mid-September to October.

Fat and well-favoured is he become. A new blue coat has replaced the rusty brown; his beard is not so long as in late winter, but it is full, dark, and trim; his neck is swollen; his muscles are tense; he is tingling with life and vigour; and, above all, his antlers are perfect, new grown, clean, and sharp—heavier now than they will be later. A new feeling comes over both sexes—first in the bull, with overwhelming power; next in the cow, with lesser force.

Filled with courage and desire, proud of his horns, and conscious of his strength, this greatest bull of the valley, gets up on some commanding ridge, fills his lungs, and raising his muzzle, he pours forth a tremendous guttural roaring that rises in pitch to trumpet tones, higher and higher, till it breaks into a shrill screaming whistle, then fades and drops again to the guttural, concluding with a few savage grunts.

This is the world-famed bugling of the Elk. I have heard it likened to the braying of a Jackass, but among those who know it in its native mountains, there is only one opinion—that it is the most inspiring music in nature.

Here is this magnificent creature, nearly half a ton in weight, strong as a bull, fierce as a Lion, in all the glory of his new antlers, proud of them, surrounded already by a band of his cows. He is challenging all the world to a fight; he is prepared to stake his all on the issue. "I am out to fight," he roars, in tones that tell of his huge round chest. "My horns are clean and sharp, I am big and strong, I fear no living thing. On this fight I will stake my range, my family, my social position, my limbs, my life."

The martial clamour borne over hill and valley can scarcely fail to reach others of the same kind and in the same mood. Soon the distant woods give forth reply—the bugled answer of some other knight—maybe one like himself, with many possessions in the form of wives, to stake—maybe a youngster, just coming into his strength with nothing to risk but life and limb, with all his fortunes yet to make, and glad to get his chance.

But the deep bugle notes are characteristic of the prime bull. Younger bulls are often called "squealers," and, being more numerous, they are responsible for the bugling being sometimes called "whistling."

J. A. Ricker, of Denver, related to me an incident that he witnessed on two different occasions. One day, Nov. 1, 1899, while hunting in Routt County, Colo., he heard a bull Elk *whistle*. He got off his Horse and, sneaking over a ridge, saw the bull in a hollow with three cows. Suddenly a reply to the challenge came from a distant bull that had a splendid *bugle*-note, winding up with three separate toots. The bull near at hand no sooner heard this than he dashed at the nearest cow, prodding her severely with his horns; then at the others, driving them as fast as he could away from the direction of the other bull. Evidently, he was afraid to risk a fight with the *owner of that voice*.

While September and October are whistling time, I have heard it in nearly every month of the year—viz., June, July, August, September, October, November, and January.

Pugnacity

Park, or half-tame, Deer are notoriously dangerous in the rutting season.

It is rarely that a wild Elk will go out of its way to attack a man, but this has happened more than once. Charles H. Stonebridge, of New York, vouches for the following:

About two years ago, John Legg, one of the ranchers in the Valley of the Stinking Water, Wyoming, had been up in the mountains hunting and was returning with his trophies on a pack horse. The trail from the Continental Divide runs along the bank of the river, and is very dangerous in a great many places. After coming down about 40 miles, Legg came to a particularly bad part of the trail; nothing more, in fact, than a shelf about two feet wide on the side of a cliff, and extending for about 300 feet. On one side, there was a straight wall of rock, on the other a sheer fall to the cañon below. A single misstep meant instant death.

Legg had been over this trail many times with the Horses he was then using, and, without hesitation, drove his pack animal before him. When about halfway across, he was suddenly confronted by a large bull Elk, coming from the other direction. The Elk seemed to consider that he had right of way as, without a moment's delay, he lowered his head, dashed at the pack horse, and hurled it over the cliff into the cañon below, where it was instantly killed. Having got rid of the pack horse, the bull now turned on the saddle beast, and Legg was in imminent peril. It was impossible for him to get off his Horse on either side, or turn around, and the least misstep of his Horse would have thrown both over the cliff. The Horse, however, remained perfectly quiet. The rider drew his revolver, as the Elk charged,

and by one shot sent him crashing down the cañon below almost on top of his victim. Legg crossed to the other side, and worked his way to the bottom of the cañon. Here he found his pack horse terribly smashed, and the stuff he carried more or less injured. He secured the blankets and other things not broken, and, loading them on his saddle horse returned to his ranch on foot.

When in Denver in the October of 1899, W. N. Byers related to me the following: "In 1853, I was on the Skookumchuck (fierce water) which runs from the Olympics into the Sound, and I came on a bull Elk. It was among fallen timber where he had such difficulty in getting along that I easily ran alongside when I wished. But each time I came close, he bristled up and showed fight."

There have undoubtedly been a great many persons killed by Elk that were tamed—tamed so that they lost in a manner their fear of man. E. Hough, referring to the Elk in Forest Park, St. Louis, records in the middle of October, "the killing of Keeper Henry Nelson by a bull Elk, one of the Park herd. The animal was goring an Elk calf, and when Nelson tried to stop it, the Elk turned and drove its brow antlers through his breast, pinning him to the fence. This same Elk is said to have killed a man in Lincoln Park, Chicago."[74]

Judge Caton gives in great detail the treeing of two men and the killing of another by one of his Park Elk, a 4-year-old, that seems to have been of exceptional ferocity. "He was truly terrible."[75]

The Battle

We all love to see a fight when not personally in danger. I have tried many times to see a real Wapiti duel. I have heard them in the woods more than once, but never actually saw one.

In October, 1900, I was witness of a curious incident in a trifling Wapiti skirmish near Richmond, Va. A fine big bull Elk was bugling in the woods of the Elk Park. A smaller bull, a 4-pointer, replied with a whistle, then came on in slow and stately march. They locked horns rather deliberately, but the second bull was too light. Again and again, he was forced backward, and broke away to save himself. After resting each time some 50 yards off, he would shake his head, squeal, and try again, with no better success. At length the big bull put a little more life into his attack, and

[74]Forest & Stream, Oct. 19, 1895, p. 338.

[75]Antelope, etc., pp. 284-86.

drove the young one afar. As he returned, a cow Elk came out of the woods, and, at the same time, from under a few sprigs of brush on the much-trampled battleground, there arose a spotted fawn, which had been crouching there during the lively fight which was all around him. Whether the bulls were careful not to crush him, or whether he escaped injury by accident, I do not know, but I suspect the latter.

W. A. Baillie-Grohman, the well-known sportsman, was witness of a tremendous fight. His description is well worth reproducing:[76] The author was camped in the mountains of western Wyoming, and one moonlight night in "bugling time," went forth afoot, when the woods were astir with Wapiti. After seeing a large bull scatter a band of small ones, he saw a second prime fellow come bugling into the lists, and once they had clashed together, Baillie-Grohman came up within 30 yards, knowing, he says, from former experience, that "probably I might have walked close to the stags without interrupting the tussle; but I was afraid that one or the other, or both, might turn against me, as I knew our European Red-deer do during the rutting season, and an Express [rifle] is but a poor weapon at night time. So I kept at a respectful distance, some 20 or 30 yards from cover, and from there I watched the fight for quite half an hour.

"For several minutes at a time, the antlers appeared inextricably locked together, and as one of the stags seemed the stronger, though not the more agile of the two, superior weight would in those moments enable the heavier animal to fling his adversary from side to side, without, however, being able to free his own horns wherewith to do grievous injury to his foe.

"Before long, one was on his knees, pressed down, apparently by main force; then the other, staggering back, would for a brief moment halt before rushing with deadly intent at his adversary; but by the time he had regained his breath, and was ready for the onslaught, the foe was on his legs again, and antler crashed against antler with a force that seemed irresistible. The heavier of the two stags appeared to be well aware of the one advantage his superiority in weight gave him, for the tactics just described were repeatedly tried by him, only to be foiled by his agile adversary, who invariably managed to regain his feet and receive the charge with lowered head and antlers *en garde*.

"The combatants had moved about the meadow, much as expert boxers would, though after a quarter of an hour's fighting, weight had told its tale, and the smaller stag had to retreat more frequently than ever, and the adversaries were fast approaching the edge of the forest at the latter's back. Here a last stand was made by the defeated one, and a ten-minutes'

[76] Sport & Life in British Columbia, 1900, pp. 80–81.

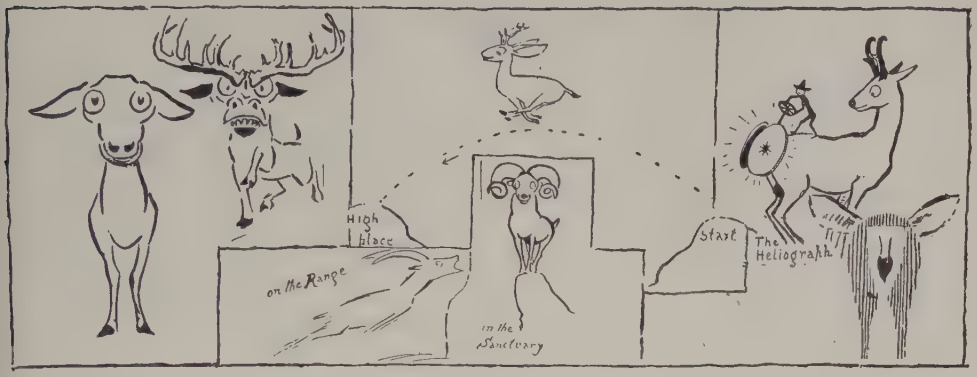
tussle ended by bringing both on to their knees; and here, too, the repulsed one received his death wound, though I failed to see exactly how it was inflicted, the movements being so rapid and the light too indistinct. It appeared to me, however, that the weaker stag, on regaining his feet first, made a dash at his foe, but from some cause or other his lunge missed its aim and, while the impetus carried him past his still kneeling adversary, his whole flank was exposed to the thrust of the latter's horns. The next second he was down, too, but this time with a heavy thud, stretched out at full length, just out of reach of the kneeling victor, who, too exhausted to rise, kept butting at the body which he could not reach. A minute later, they were both up again, but the battle was decided, and the wounded hart fled into the forest, where I found him next morning dead, with a ghastly slash two feet in length that had ripped open his side and penetrated his vitals."

The Finish

There may be another finish to the combat—a finish that is even more final. The knights have clashed together, the strong and springy antlers have yielded a little under shock of onset, but sprung together locked—locked so firmly that now there is no fencing, nothing but pushing and wrestling. It is as if each held the sword-wrist of his foe in a riveted clutch, and when at length one of the wrestlers would spring back to avoid defeat or for a better thrust, he finds himself absolutely bound to his foe, with antlers intertwined. Try as he may, he cannot wrench them free. Strong and weak alike are now face to face with a lingering death. Many a time have two carcasses been seen thus antler-bound. Several times White-tailed Deer have been found thus—one still alive, the other dead a day or two; the stronger just able to drag his fallen foe enough so he could gather a little food, that could but prolong his misery. More than once the first to die has been partly eaten by Wolves, which the other feebly struggled to avoid. A score of times I have seen the remains of this among the smaller Deer, but only once have I found it among the Wapiti.

It is years ago now, at the Palette Ranch, on the headwaters of the Greybull, where choicest elk-lands sloped to buffalo-plains, in a little valley where it all befell, that I saw the records and the proofs. Here was the harrowed earth where the fight took place; here, on the battle ground, the lankened forms of the knights, big and of even might. The Wolves had picked their frames, but the peeling skulls were there, with the two great pairs of branching gear inextricably locked and gripped and interlocked. In fancy's eye, I saw the tragic end; while with the living eye I saw, not far away, a scurry-

ing herd of cows with the lesser bull that had inherited what his betters had battled for in vain.



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Woodland Caribou or American Reindeer

Rangifer caribou (Gmelin)

(*Rangifer*, made up by Hamilton Smith in 1827, apparently from old French *Rangier*, a Reindeer, and the L. *fera*, a wild beast (Cent. Dict.); *caribou*, the New England Indian name.)

Cervus tarandus caribou Gmelin, 1788, Syst. Nat., I, p. 177.
Rangifer caribou Aud. & Bach., 1854, Q. N. A., III, p. 111.

Type Locality—Eastern Canada; i. e., Quebec

French Canadian, *le Caribou.*
Cree, Sauteaux, and Ojibway, *Ah-tik.*
Chipewyan, *Et-then.*
Yankton Sioux, *See-hah Tang-kah.*

The genus *Rangifer* (H. Smith, 1827) shows the characteristics of the Family *Cervidæ*, but has further: Palmated antlers, which are present in both sexes; muzzle, all hairy; a tarsal or inside hock gland, but no metatarsal or outside mid-leg gland; the hoofs broad and flat, the cloots or accessory hoofs so long as commonly to reach the ground; teeth as in the Wapiti; but often without canines. All the American species of Caribou agree with the present in general arrangement of white patches.

Different Kinds of Caribou

Some zoologists believe that there are over a dozen species of Caribou in America, and a number more in the Old World.

The English zoologist, Richard Lydekker, is of the opinion[1] that all the Reindeer and Caribou of northern Europe, Asia, and America, are one and the same animal, modified by circumstances into a number of geographical races. This much is certain: There is one peculiar and well-marked colour pattern throughout the group, they bear the same type of antlers, and no one yet has been able to point out any one constant and reliable character of colour, visible form, or exterior anatomy, that will absolutely distinguish one race of Caribou from another. Their intergradation seems complete in all departments, however much they may differ in colour or in size. It is

[1]Deer of All Lands, 1898, p. 37.

interesting to note that all mammals with this same range have split into parallel races.

The conservative way to approach this complex problem is doubtless the best. Therefore, avoiding both extremes, we accept the division of all the American Caribou into three main groups, *Woodland*, *Mountain*, and *Barren-ground*, with the *Dawson Caribou* as a near relative of the last.

Leaving out of consideration the Old World races, those found in America may be recognized as below, provided we are dealing with full-grown males. As for females and fawns, one can name them only by the regions where they are found.

The Woodland or Big Caribou is distinguished by great size, dark colours (except the Newfoundland form), massive antlers with more or less flattened beams and 5 or 6 palmations. This species is split into 3 races or forms, among which is the Newfoundland Caribou, a nearly white animal, so well marked that it may ultimately receive separate consideration.

The Mountain Caribou, which is a large dark creature with 3 races, and enormous horns.

The Barren-Ground, Arctic, or Little Caribou is found only in the treeless tundra of the Far North in Europe, Asia, and America. It is distinguished by its small size, pale or white colours, and long thin antlers with 3 or 4 palmations. The American forms of this are 8 in number.

The Dawson Caribou of Queen Charlotte Island is a dwarf form, now extinct.

Size. How large is the Woodland Caribou? Larger than the White-tailed Deer, smaller than the Wapiti. This is a comparative answer that usually satisfies the hunter. Exact measurements of typical specimens are not available. Audubon and Bachman give thus the dimensions of one $2\frac{1}{2}$-year-old, presumably a male:[2]

Length from nose to root of tail	6 ft. 0 in.	(1830 mm.)
Length of tail (vertebrae)	4 "	(102 mm.)
Length of tail (including hair)	$6\frac{1}{2}$ "	(165 mm.)
Height of shoulder	3 ft. 6 "	(1067 mm.)
Width between the eyes	$5\frac{1}{2}$ "	(140 mm.)
From point of nose to lower canthus of eye	9 "	(228 mm.)
From point of nose to ear	1 ft. 2 "	(355 mm.)
Height of ear posteriorly	5 "	(127 mm.)

Weight. The Woodland Caribou is much heaver than the Barren-ground species; as the bucks weigh from 200 to 300 lbs., the does about a

[2] Q. N. A., III, p. 113.

quarter less. These figures, it will be seen are about half the weight ascribed to the Mountain Caribou.

Colour. In winter, the general body colour of the Woodland Caribou is a dull grayish brown or dun, darker on the face and legs. The neck, forehead, belly, spot behind the shoulder, under side of the tail, the region about the tail, and the band around each foot, are white.

In summer, its body colour is darker.

Individuals vary greatly, however, in respect of their body colour, as well as in the amount of white.

The young have traces of a few pale spots on the ground colour.

Albinos are occasionally found. Concerning them I find this suggestive note by Hadwen and Palmer:

"Both Lapps and Eskimos have noticed what they call the sleeping propensity of white animals, and state that it is possible to approach and capture them when they are lying down. For this reason, it is said that Bears and other predatory animals frequently catch them. One white fawn was noticed lying in the middle of a corral, apparently oblivious to all the noise and confusion that was going on at the time. It was possible to walk up to it, apparently without its hearing or being aware of one's presence, and when touched gently, it would partly raise its head, and then go to sleep again. When it finally became aware that it was being touched by a man, it got up and made off in a great hurry. This observation was repeated later, so that it seems established that white animals are deficient in hearing and scent as well as vision."[3]

It is a matter of common remark, if not established fact, that White Cats are more or less deaf.

Races

The following forms have been recognized:

caribou Gmelin, the typical form. T. l., Eastern Canada, i. e., Quebec.

sylvestris Richardson, like *caribou*, but with larger, slenderer head, and much darker colours; a gray Caribou. T. l., Southwestern shores of Hudson Bay.

terraenovæ Bangs, about the same size as *caribou*, with white areas still larger, covering the entire neck and lower half of the face up to the eye, but no white eye-ring. A white animal with horns excessively palmated; both brow antlers normally bear-

[3] Reindeer in Alaska, p. 6.

ing shovels. All the points are turned forward and inward. A white Caribou. T. l., Codroy, Newfoundland.

History and Names

In 1497, John Cabot discovered Newfoundland, but "called it Prima Vista, and the Iland before it S. Iohns. . . . There were white Beares and Stagges farre greater then ours."[4]

Omitting the Greenland form, this we believe to be the first mention in history of any American Caribou, and it refers to the Newfoundland form, which one may claim is the species whose range is most near to Europe.

Although this was the common and characteristic animal of these northern parts of the continent visited by Roberval (1534) and Cartier (1535), this species was not observed by them. So far, I have found no other mention of the creature until that by Les Carbot (or de Monts) in 1609.[5] He lists as the principal beasts of the chase: "Ellan, Caribou, Cerf, etc." "Caribou" (in this spelling) is the word he uses throughout.

But G. Sagard-Théodat, in 1636, wrote of these animals as Caribou or wild Asses (*Caribous* or *Asnes Sauvages*).[6]

Josselyn, writing in 1672, says of this: "The *Maccarib*, *Caribo*, or *Pohano*, a kind of Deer, as big as a Stag, roundhooved, smooth hair'd, and soft as silk, their horns grown backward along their backs to their rumps and turn again a handful beyond their Nose, having another Horn in the middle of their Forehead about half a yard long, very streight but wreathed like an Unicorn's Horn, of a brown jettie colour, and very streight, the creature is nowhere to be found but upon Cape *Sable* in the *French* Quarters, and there too rarely, they being not numerous, some few of their Skins, and their Streight Horns are (but very sparingly) brought to the *English*."[7]

From this it will be seen that "Caribou" or "Maccaribo" is a native American word—the Indian name of the animal. Generations later, Sir John Richardson was misled into stating that "'Caribou' was a French-Canadian word (from 'Quarrébœuf,' a square ox), derived from the size of the antlers."[8] Why large antlers should constitute a *square ox* is a puzzle, and why the adjective should be transposed in this case is another. We can only regret that Richardson, usually so reliable, should have made the mistake of recording a *post hoc* and absurd explanation.

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[4]Purchas, Pilgrimages, 1617 ed., p. 915.
[5]Les Carbot, Nouvelle France, pub. 1618, p. 896.
[6]Hist. Canada, 1636, p. 750.
[7]New England Rarities, 1672, pp. 20–21.
[8]Zool. of Voy. Herald, 1854, p. 20.

The Caribou is the "Reindeer" of America. This word Reindeer was long, though erroneously, supposed to mean *running Deer*, in allusion to its speed. This, however, is another afterthought, in the way of derivation, but so appropriate that it is still found in some very reputable dictionaries. The word really means "Pasture Deer" from the Lapp *reino*, pasturage.

About 1800, David W. Harmon wrote his "Journal of Travels in the Northwest," and discussing the big game of the mountains, he says:

"There are two kinds of Cariboo. The only difference between them is that the one is about twice as large as the other, and the hair of the smaller is of a much lighter colour. The larger will weigh nearly as much as the Elk; but in shape and the colour of the hair, it more nearly resembles the Moose."[9]

Baron Cuvier in "The Animal Kingdom," 1827, Vol. V, pp. 304–05, distinguishes 3 kinds of Caribou:

1. Caribou des Bois; 2. Great Caribou of the Rocky Mountains; 3. Labrador or Polar Caribou.

For the great Caribou, he suggests the name *coronatus*, but leaves us in doubt about its identity.

This classification was accepted by Richardson in 1854. He says: "In Rupert's Land and the northern extremity of the Continent, east of the Rocky Mountains, three races of Reindeer are known and recognized by the natives and fur-traders, all passing under the French-Canadian appellation of Caribou. . . .

"The smallest is the Barren-ground Reindeer, which brings forth its young in the islands and on the coasts of the Arctic Sea, and does not migrate further south in winter than the skirts of the woods.

"The largest inhabits the wooded mountains and valleys of the Rocky Mountains, bordering on the Mackenzie.

"And the third race, of an intermediate size, frequents the wooded and hill districts of Rupert's Land, passing during winter into the interior and migrating in summer to the coast of James's Bay. This kind seems to have been formerly plentiful as far south as the State of Maine, and small herds still frequent the border of Lake Superior and many parts of Canada."[10]

This is the first clear and correct discrimination of the various groups of Caribou found on the North American mainland; and although no fewer than 16 species or races have now been described, I suspect that, in the end, we shall come back very nearly to Sir John Richardson's view.

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[9]Journal, 1800–19, pub., Toronto, 1904, p. 374.
[10]Zool. of Voy. Herald, p. 20.

Range and Records

The map shows the range of the Caribou in primitive times, and, strange to tell, we must credit it with much the same area to-day. For although its numbers are greatly reduced in certain regions where hunters overabound, there is evidence to show that the Caribou is found to this day even along its southern frontier. Here are good records, beginning in the extreme east:

Newfoundland. "Caribou may be found all over Newfoundland at some time during the year."[11]

Nova Scotia. "The only part of the Province where Caribou are found in any number is in the Northern parts of the counties of Inverness and Victoria. . . . It is not expected, however, that the Caribou will greatly increase in numbers, unless it be in the Northern part of Cape Breton, where conditions are most suitable for them."[12]

New Brunswick. Generally distributed in the north; fairly common in the northwest of the Province.

Gaspé, Que. "Fairly common on the higher peaks of the Shickshock Range."[13]

Maine. "Foxcroft, Me., Nov. 21 [1914]. The first herd of Caribou to be seen in Maine for over 25 years was reported here to-day by John J. Newbegin and S. Phillips Wilson, Philadelphia sportsmen, who saw 12 of the animals, 7 cows and 4 bulls, on Mt. Katahdin last Tuesday morning. The animals trotted off into the woods without appearing greatly alarmed."[14]

"Herbert Spencer, a warden located in the vicinity of the St. John waters . . . corroborated the reports that have been coming in for the last two years. Mr. Spencer states that this winter he has observed a herd of about 30 of the animals which is staying around a certain section of the Maine side of the St. Lawrence River."[15]

The only record I find for the next two of the northern States is the following:

Vermont and New Hampshire. "It is only a few years since this animal occasionally appeared in the northern parts of Vermont and New Hampshire."[16]

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[11]Gower Rabbitts, letter, Nov., 1923.

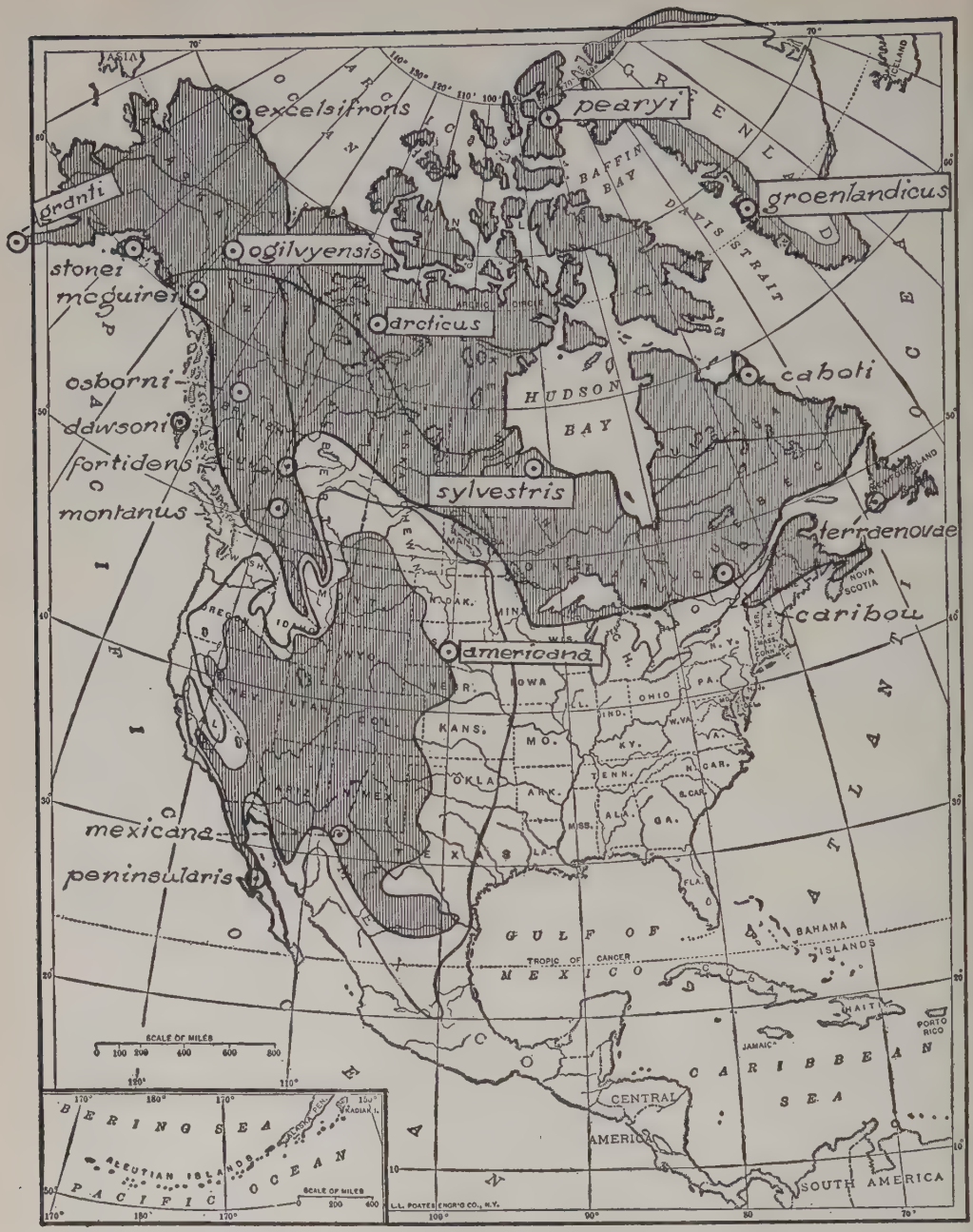
[12]N. S. Game Comm. Rep., 1913, p. 8.

[13]G. G. Goodwin, Journ. Mamm., Nov., 1924, p. 257.

[14]Forest & Stream, Dec. 5, 1914, p. 723.

[15]Harry B. Austin, Chairman of Commissioners of Inland Fisheries and Game, State of Maine, in Forest & Stream, Feb., 1915, p. 99.

[16]Emmons, Quads. Mass., 1840, p. 79.



MAP II.—RANGES OF CARIBOU AND ANTELOPE

By E. T. Seton, with assistance of the Biological Survey

Range of the Caribou (almost wholly in Canada): The three groups, Barren-ground, Woodland, and Mountain.

Range of the Antelope (almost wholly in the United States): The ancient in heavy outline; to-day (1924) in faint tint.

Reference to early authorities such as Josselyn (1672) shows that in New England this species was, at best, a rare straggler, except in Maine.

Quebec and Ontario. Throughout the Canadian faunal region of Quebec and Ontario, the Caribou is and always has been of general distribution. In 1897, G. S. Miller, Jr., wrote: "Caribou are very abundant on the north shore of Lake Superior, where they replace the Deer and Moose of the Canadian Zone."[17]

Michigan. Three records from the Upper Peninsula and 2 from the northern part of the Lower, are given by Norman A. Wood.[18]

Wisconsin. "There is no reason to doubt the occurrence of the Woodland Caribou in early days in Northern Wisconsin; but at the present time, if it occurs at all, it must be considered as an exceedingly rare straggler."[19]

Minnesota. "The writer has encountered the Caribou in Minnesota only about the headwaters of the White-face River and along the St. Louis River near Knife Falls. There it was in 1884 not rare, though so shy as to be secured with difficulty."[20]

In all the region from Lake Superior to Lake of the Woods and Lake Winnipeg, the species has been and is of general distribution in changing numbers. Thus, E. V. Nicholson, of Port Arthur, writes me: "It is a well-known fact that about 20 years ago, Caribou were very plentiful, not only on the shores and islands of Lake Superior, but at many widely divergent points varying from 100 to 150 miles inland and beyond. Latterly [1924] these animals have practically disappeared from the shores of Lake Superior, and also from points having a radius of about 200 miles from Thunder Bay."

In Winnipeg, Messrs. E. W. Darbey & Co., the taxidermists, have abundance of horns, skulls, etc., representing the country from Lake of the Woods to Lake Winnipeg, and the Interlaken, that is, the territory between Lakes Winnipeg and Manitoba.

Northward to the Saskatchewan, the species is still found; westerly, i. e., in the Athabaska Valley, it is scarce, and indeed always was.

Montana. When I was at Glacier Park, Montana, in Sept., 1916, I was assured by the guides that about Kintla Lake, an odd Caribou was still to be found.

Idaho. "Thirty years ago, there were a few Caribou in northern Idaho, northeastern Washington, and southern British Columbia, and at a still

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[17]Mamm. Ont., Proc. Bost. Soc. Nat. Hist., 1897, p. 40.
[18]Mich. Mamm., 1914, p. 3.
[19]Cory, Mamm. Ill. & Wis., 1912, p. 81.
[20]Herrick, Mamm. Minn., 1892, p. 277.

earlier date than this, these animals were abundant there. We have seen camps of Kootenai Indians bring in to Sineaqueteen—the old crossing place of the Pend d'Oreille River—fresh skins which they said had been taken but a few miles north of there.

"There seems to be more reason to think that a small herd of Caribou still ranges over the Cabinet Mountains north of Lake Pend d'Oreille. It is believed that the herd is small, not more than 15 or 20 in number."[21]

In southern British Columbia its range is nominally unchanged, but its numbers are greatly reduced.

In *Anticosti*, "it does not occur."[22]

Maxwell Graham, of the Department of Interior, Ottawa, tells me that Caribou bones have lately been dug up on Anticosti.

Migrations

In one sense, all the Deer are migratory. The Moose may migrate only 5 or 10 miles from the low swamps in summer to the hardwood ridges in winter; the Blacktail of the mountains may descend from the high hill-tops of its summer range to winter pastures of a lower level, miles away; the Wapiti may make a similar change on a still larger scale, when the first heavy snow comes down to warn it of the season's close. But the Caribou are the only Deer that at certain seasons gather in herds to travel clear out of one region to some entirely different region.

In considering the migration of the Woodland Caribou, I find abundance of records such as the following in my Journal:

Ingolf, Ont., near Manitoba boundary, Sept. 16, 1904, after conferring with many local hunters and trappers, it seems sure that the Caribou are common here in the winter, but a few are found here the year round.

"In parts of Arctic America," says Millais, "the Mackenzie herds, and in Finmark the Northern European herds, live for nearly six months in forests, only repairing to the open tundra or mountain wastes in autumn and winter, and again returning to the forest belts in spring. The same may be said of most of the other local races, whether so-called Barren-ground or Woodland.

"In this work, I have endeavoured to show, although it does not seem to be known to naturalists, that the Newfoundland Caribou, which have always been known as a typical woodland race, does precisely the same thing, and

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[21]G. B. Grinnell, Forest & Stream, Sept. 23, 1911, p. 486.

[22]W. Couper, Forest & Stream, June, 1877, p. 300, also H. Y. Hind, Explor. Labrador, 1863, Vol. II, p. 70.

leaves the timber in October, returning to it again in the following April."[23]

Dugmore adds: "Most questions regarding the Caribou migration can be answered only in an indefinite way. It is difficult to say, for instance, whether all the Caribou in the island migrate either over long or short distances, or whether a proportion of those spending the summer in the more northerly localities move southward, or whether there is a partial migration in a southerly direction throughout the island during the autumn. I have been informed that all the Caribou which pass the region near Howley come from the northern peninsula. How, then, is it possible that in the most northerly part of that region there is good Caribou shooting late in the autumn and winter, immense herds staying in the mountains back of Port Saunders, so far as I can learn, all winter? . . .

"The only fact that seems to be actually known is that the first snowstorm after the 18th of October starts the herds moving southward from the direction of the northern peninsula and that the greatest numbers pass between Sandy River (Grand Lake) and a few miles east of Howley. . . . The migration is generally in full force for about two weeks; after that, it continues intermittently for several weeks."[24]

After a Caribou expedition in Newfoundland, Chauncey J. Hawkins writes: "I was surprised above everything else at the number of these animals to be found in the interior of the Island the last of July. So much has been said about their migration that one can easily conclude that all the larger species of Caribou except a few old stags leave the southern and central portion of the Island and go toward the north. But such is far from the fact. Thousands of these animals never follow the migration northward. Indeed, after studying the animals in July, in the center of the Island, I am convinced that there are more that do not migrate than those that go to the northern peninsula."[25]

So also Henry Y. Hind, discussing the Woodland Caribou in Labrador, says: "Every third or fourth year, they emigrate to a distant part of the country, revisiting their former pasture grounds after the lapse of the same period. In April, as soon as the snow begins to get soft, they migrate towards the quarters where they intend to pass the summer, travelling always at night."[26]

In a word, it is only the main body that moves, for in every part of the range at all times of the year, are individuals to be found.

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[23]Newfoundland, p. 310.
[24]Life, p. 268.
[25]Recreation & Outdoor World, Aug., 1914, pp. 76–77
[26]Explor. Labrador Peninsula, I, 1863, pp. 214–15.

There is little doubt that the migrations of the Caribou may be explained by a consideration of the insect clouds at one season in conjunction with deep snow at another. The latter hides their food in winter, thus driving them into the woods; the insect hordes force them back again in spring to the partial solace of the kindly breezes that fan them in the open, or on the highest levels of the nearest mountains. These agencies are more fully discussed in the Life of the Barren-ground Caribou.

Home Range and Haunts

As noted elsewhere, no wild animal literally wanders; all have a limit of individual range, a home locality. But I have failed entirely to get any light on the extent of the individual Caribou's range. More than any other animal that I know, it roams with little regard to anything but food and wind.

During the winter, it is not under the necessity of "yarding," as do Moose and many other kinds of Deer, for it can travel *over* the drifts when the snow is too deep to travel *through:* and travel it does the whole year round. I have yet to learn of this animal settling down contentedly in any given small locality. Its food is everywhere, it follows its food, and famine seems to be unknown in its world.

In Newfoundland and in all of its range east of the Rockies, the Woodland Caribou is a creature of the level wastes that are covered with scattering spruce woods alternated with upland bogs or wide swamps, where its natural snowshoes give it a superior advantage over man and hostile beasts. Its relative, the Mountain Caribou, however, frequents steep hillsides and even rocky places, as well as meadows, woods, and swamps.

Numbers

The numbers of Barren-ground Caribou are discussed in the next Life. Admittedly, there must be many millions of that species; but it seems clear that the Woodland Caribou is nowhere so plentiful.

Joseph Seabury, reviewing the big game situation,[27] says that in New Brunswick, the Caribou killed were, for the years 1911, 1912, and 1913, as follows: 276, 261, 454; while the number of Moose killed was about 6 times, and the number of Deer 10 times as great.

Discussing the abundance of Caribou in Newfoundland, Millais says:

[27]Forest & Stream, July 25, 1914.

"I had made a long journey of 15 days into the interior, to a district which no white man has ever previously entered, and during 20 days' hunting, saw nearly 2,000 Caribou, including 5 or 6 big stags every day."[28]

"On 31st October the big migration set in from the north, and I saw no fewer than 14 big stags and 145 does."[29]

Dugmore writes: "To those who, when out hunting, are accustomed to seeing 2 or 3 wild animals in a day, and believe themselves fortunate indeed if they see half a dozen, the extraordinary number of Caribou to be found in a single day's walking or canoeing in Newfoundland, must be a great and very delightful surprise.

"During the autumn migration, it is not unusual to see 400 or 500 in a day, and earlier in the season, when the animals are following their regular habit of slow wandering from barren to barren, or from hill to hill, one may easily see several dozen singly or in small herds; while if we visit the island, when the snow lies deep and venture into the animals' winter quarters, I am told that irregular herds numbering thousands of head may be found."[30]

While watching the Newfoundland Caribou drifting southward between Oct. 7 and 21, 1912, he says: "On some days, from 500 to 1000 would pass within sight of me."[31]

Dugmore, in gauging the Caribou population of Newfoundland, offers the following: "How many there are it would be difficult to say. Perhaps 150,000 altogether would be a fairly safe estimate."[32]

On the same head, Millais says: "Mr. Moulton, of Burgeo, judging by the numbers wintering in the barrens north of that place and White Bear Bay, puts it at 250,000, and thinks that they are increasing at the rate of 10,000 annually. Mr. [James P.] Howley (director of the Geological Survey), on the other hand, places the figures at 100,000, and I think that double the number is a very fair estimate.

"In spite of the enormous slaughter which takes place annually, and which is every year greatly on the increase, Newfoundland will keep her Deer for many centuries to come, if all shooters are licensed, and the number of Deer shot by each person does not exceed 3. Thus, putting the death rate at the highest estimate of 3 animals to each of 4,000 shooters, 12,000 would be killed out of 200,000, that is a depreciation of 6 per cent."[33]

In recording these calculations of the Caribou in Newfoundland, I am

[28]Forest & Stream, Feb. 2, 1907, p. 177.
[29]Newfoundland, p. 303.
[30]Romance, pp. 12–13.
[31]Romance, p. 47.
[32]Romance, p. 11.
[33]Newfoundland, pp. 333–34.

reminded of sundry estimates made on other animals. Don Pablo's estimate of his Buffalo herd on the Flathead Reservation was 500. On being rounded up, over 800 were found. The estimate of Foxes taken in Manitoba for one year about 1906 was, 1,000, yet the Government Report for 1923 showed 5,792 taken and plenty left over; for in 1924, 13,334 were taken without visibly depleting the stock.

Furthermore, the Elk in Yellowstone Park furnish a standard. When I lived there in 1897, the official estimate of Elk was 30,000 on the 3,000 square miles of the Park. Yet I wandered about the Park for three months and saw but one band; it contained about 50. Thus, they were not nearly so visibly abundant as Caribou are in Newfoundland. The Park had 10 Elk to the square mile. Newfoundland has 40,000 square miles, so should have easily 500,000 Caribou.

Anatomical Details

Clad next to the skin with a coat of oily wool, the Caribou is covered exteriorly with a dense pelage of fine quills. While they are truly hairs, each is a little barrel of air, which increases in thickness until the coat is perfect. Being air cells, they are light, and make excellent non-conductors, thus conserving the bodily warmth of the animal.

But they are of service also in another way, namely as floats. Baillie-Grohman mentions the use of Caribou hair to fill life-belts, and says, further, that a German, Doctor Mintz, has invented a Caribou- or Reindeer-hair cloth which, when made into suits, prevents the human body from sinking.[34]

Every Caribou wears, in effect, a cork jacket; and when this is in prime condition, the creature seems *on* the water rather than *in* it. No other quadruped that I know floats as high out of the water as the Caribou.

Dermoid Cysts

Long ago (1770), Dr. Thomas Hutchins of Hudson Bay wrote a manuscript on the natural history of the region. This manuscript was much used by Dr. John Richardson, who says:

"The same gentleman mentions that the buck has a peculiar bag or cist in the lower part of the neck about the bigness of a crown-piece, and filled with fine flaxen hair neatly coiled round to the thickness of an inch. There is an opening through the skin, near the head, leading to the cist, but Mr.

[34]Sport & Life in B. C., 1900, p. 133.

Hutchins does not offer a conjecture as to its uses in the economy of the animal."[35]

Millais, writing concerning the Newfoundland Caribou, says: "On Oct. 20th, I killed a very large stag near Shoe Hill, and whilst removing the neck skin, my knife slipped and disclosed a very curious sac about 5 inches long and 2 broad; this contained growing hair on the inner skin, and the cavity was full of a mass of compressed hair soaking in a watery mucus. This skin bag was situated in a thin vellum of the inner skin in the region of the upper throat. The Indians call the little bag 'Piduateh,' and the few white men who know of its existence, the 'Toler' (i. e., crier or bell), so that it may have some affinity to the long throat appendage found on the Moose and known as the 'bell' . . . The Indians told me that this sac is only found in 1 in 50 Caribou, generally in the males, and that it is sometimes found in the inside skin of the cheek."[36]

On Aug. 23, 1906, at Winnipeg, I was shown by E. W. Darbey, a Moose skin with a dermoid cyst. It was situated on the middle line of the throat, halfway between jaw and chest. It was $1\frac{1}{2}$ inches wide by $1\frac{3}{4}$ inches long. It was full of coiled hair, much like that on the throat, except that it was of a flaxen colour. Some of the hair was growing there, the rest was loose but held in the sac. The loose hair was in three layers, corresponding probably to the three coats the creature had grown. The sac was less than an inch deep, and had apparently been scarcely closed at the mouth.

It does not seem to me necessary to find a use for these. They are more of the nature of diseases or accidental infolds. Ingrowing toenails, recurved antlers, inverted eyelashes may be cited as parallels.

Some dermoid cysts of another type are discussed in the Moose Life.

Communication

A gregarious animal has usually many means of communication with its fellows. In this case, the well-marked livery of the species serves as his uniform does a soldier; it lets friend and foe alike know who this is.

Next in importance is the "white flag"—the tail and its surrounding disk, with which, as in most Deer, the Caribou does its wigwag signalling. The sudden elevation of this white tail when danger is sensed, conveys at once a silent alarm to the nearest of its kind. Probably the white patch of hair on the throat is used much as the Antelope uses its disk; that is, as a flash-signal. An illustration of this is cited in the Life of the Barren-ground Caribou.

[35]F. B. A., I, 1829, pp. 250–51.

[36]Newfoundland, p. 312.

Glands

The neck glands of the Caribou are thus noticed by Dugmore:

"On the neck, just below the ears, and also under the throat, are large glands, which are swollen only at this time of the year [the rut]. In some instances, these glands are so large as to distort the neck, and detract greatly from the appearance of the stag."[37] These, apparently, are the glands which, in all male Deer, are swollen at this period. Why and to what purpose, is not known.

Judge Caton has pointed out[38] that the Woodland Caribou and Norway Reindeer have in each hind foot, deep between the toes, a curious gland that exudes an unctuous substance. This is apparently part of a system of scent glands.

Dugmore furnishes a convincing observation on its operation. He writes: "Not once, but on many occasions, I have seen one or more Caribou walking quietly along a trail, when suddenly they have been frightened, either by seeing me move, by the sound of a camera being arranged, or worst of all, by a draught of wind carrying my scent to them. Whatever the cause, makes no great difference. On being startled, the animals have jumped; then, after standing still for a moment to examine the cause of their alarm, they have bolted. For hours afterwards, every Caribou, on arriving at the place where the frightened ones had jumped, has started violently, and has on nearly every occasion, turned and run in a manner that showed every indication of fear, even though my presence was entirely unknown to them. My idea is that, when the animal is suddenly frightened, it expels a certain fluid from the glands in the foot, and that this fluid is a signal of alarm, a silent and invisible warning, but none the less so positive that none dare ignore it."[39] For another discussion of smell signals see the Antelope Life.

In Norway, I have seen the Reindeer again and again rubbing the growing horns on the region of this gland. The Norwegians told me that it was done to oil the horns. I think, however, that probably the action was merely to scratch the tender velvet of the growing antlers; just as a Cow or Sheep always scratches its head with its hind foot. It is well known that in clearing the horns the stag often uses his hind foot—never the front ones.

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[37] Romance, p. 25.
[38] Antelope, etc., p. 265.
[39] Romance, pp. 89, 90.

Foot-clicks

The most singular, perhaps, of the sounds made by the Caribou is the clicking or creaking of its tread. At every step, each foot gives out a loud, sharp crack.

This is easily heard at a distance of 50 feet in a wind, and twice as far in still weather. When a herd is moving along, the countless crackles make a volume of low, continuous sound.

Persons who have never heard this curious clicking, have no difficulty in explaining it: "Of course, the hoofs spread when they bear the weight of the animal," they say, "and, when lifted, the hard surfaces spring together with a 'crack.'" But close observation shows that the crack is made by some mechanism *in the foot*, and that it "goes off" *while the weight is on it.*

It is not always one sharp crack, but sometimes a crackle, or several little sounds close together. Many examinations made in Norway, in the Winnipeg Zoo, and in Barnum's menagerie, have shown me that the crack takes place just as the foot is relieved of the animal's weight, but before any part is lifted from the ground. The hoofs do *not* strike together during the stride, and the crackle is *not* heard until the foot is placed and the weight is on it. Thus, it may crackle twice at each tread—always once as the weight is coming on; usually a second time as it is going off. I have walked many times on hands and knees by the side of the Reindeer to make observations. On one occasion, I induced one to walk beside me while (at considerable personal risk) I kept my hand on the knuckle joint of his hind foot. The crack took place each time with the *bending* of the knuckle joint. It was so violent that it jarred my hand. It was deep-seated, and on the level of the cloots or back hoofs. Apparently, it was made by tendons or sesamoids slipping over adjoining bones.

I have many times tried to make the click with the foot of a new-killed Caribou, but always failed.

The object of this curious sound is, possibly, the same as that of the whistling of a whistler's wing or the twittering of birds migrating by night; that is, to let the rest know what is doing—that the band is up and moving—has gone such and such a way; or to notify the little one that his mother is on the march, and that he should keep alongside.

Hoofs

The foot of this animal has another claim on attention.

As noted later in the Moose Life, nature has two answers for the prob-

lem of travel through deep snow: namely, stilts and snowshoes. These are exemplified, respectively, by the legs of the Moose and the feet of the Lynx. Both contrivances are good, but, upon the whole, the latter is the better. In the Caribou, we have a wonderful combination of the two. Nature has given to this creature of snow and swamp *both stilts and snowshoes*. Its thin, peculiar shanks are much longer in proportion to its bulk than are those of the Moose; and its hoofs are a unique combination of snowshoes and skates.

Dr. R. B. Cantrell in "Big Game of North America," 1890, pp. 110-11, says: "The bones connected with the accessory hoof in the [Woodland] Caribou are more than ten times as large as they are in the common Deer."

The ordinary track of a moving Reindeer I found to be 4 inches wide by 7 long. In places it spreads an inch wider and a couple of inches longer. As the need is increased, the bearing surface is increased by bringing more of the foot to the ground. So that in crossing bogs or deep snow, the whole leg from hoof to hock gives supporting surface. I noticed that in crossing snowdrifts, I sank much deeper than the Reindeer. I found, further, that a Reindeer has about 1 square inch of foot-support for each 2 pounds of his weight; while the Moose in standing, is under a pressure of 8 pounds to the square inch.

Captain Campbell Hardy states,[40] concerning the Caribou, "that its foot is a beautiful adaptation to the snow-covered country in which it resides, and that on ice it has naturally an advantage similar to that obtained artificially by the skaters. In winter time the frog is almost entirely absorbed, and the edges of the hoof, now quite concave, grow out in thin, sharp ridges, each division on the under surface presenting the appearance of a huge mussel shell. . . . The frog is absorbed by the latter end of November, when the lakes are frozen; the shell grows with great rapidity, and the frog does not fill up again till spring, when the antlers bud out. With this singular conformation of the foot, its great lateral spread, and the additional assistance afforded in maintaining a foothold on slippery surfaces, by the long, stiff bristles which grow downward at the fetlock, curving upward underneath between the divisions, the Cariboo is enabled to proceed over crusted snow, to cross frozen lakes, or ascend icy precipices, with an ease which places him, when in flight, beyond the reach of all enemies except perhaps the nimble and untiring Wolf."

Frank Forester (Henry William Herbert) says,[41] in his vivid description of the Caribou's flight: "Snow-shoes alone against him avail little; for,

[40]Forest Life in Acadie, 1869, pp. 129–30.

[41]American Game in Its Seasons, 1853, pp. 29–30.

propped up on the broad, natural snow-shoe of his long, elastic pasterns and wide-cleft crackling hoofs, he shoots over the crests of the deepest drifts, unbroken, in which the lordly Moose would soon flounder shoulder deep if hard pressed, and the graceful Deer would fall despairingly, and bleat in vain for mercy."

In yet another particular, the Caribou's foot stands first in its class: namely as a paddle. With his broad-spreading hoofs, he is as truly web-footed as a coot, while the thin shank and closed foot give the perfect return.

Track and Dung

The track of the Caribou is unmistakable—the widespreading half moons of hoofs with the long clouts which function as soon as they are needed to keep the animal from sinking, give it safety on bog or snowdrift.

The dung resembles that of the Family. In the winter, it is of hard, rounded pellets; in summer, it is more or less confluent, like that of a grass-fed Sheep.

Voice and Calling

The Woodland Caribou's grunt I have never heard in a state of nature, but it is said to be much like that of the Norwegian Reindeer; and my notes on that are very full.

Thus: "On July 4, 1900, got into a herd of about 1,000 half-wild Reindeer. Their only vocal sound is a grunt. This is uttered singly or else doubled; that is, two are given in rapid succession. It is sometimes the call of a cow to her calf, and sometimes is uttered by one that has been left behind; evidently a note of alarm or inquiry to find out if his friends are close at hand. When I imitated this call, the near Reindeer came cautiously and curiously toward me. Usually, when one or two in the herd begin it, the others join in till it is like a volley of grunts."

In the rutting season, Linklater tells me, he has often heard the Caribou about Abitibi make a double grunting call—the first sound raucous and deep, as though uttered while taking breath, the second more like a light explosive cough or bark. The bulls also make a deep rumbling.

Among the Newfoundland Caribou, Millais noticed that "the female call is a low grunt which she utters either when travelling or to attract her calf. She uses it at all times, and the watch doe often makes this signal of alarm before she raises her tail and bristles out the hair of the rump. Females and males also make a loud puffing snort or hiss as they spring into the air. In the rutting season, the stag makes use of two calls. It depresses the neck and raises the nose, giving vent to three loud grunts. If

much excited, it makes a second call, which is produced in the throat by means of the breath being inhaled and exhaled quickly. . . .

"The Indians of Newfoundland invariably call the Caribou stag in the rutting season, and I have called many myself. The art is quite easy, and can be learnt in a few days. The only skill required is to know when to give the call. Travelling stags come to the cry more easily than herd stags."[42]

George Linklater, my Kippewa guide, tells me that he has called them. Once he called a bull up within 20 yards.

An unlooked-for instance of a Caribou coming to a call, is furnished by Clay A. Pierce, of New York. He was following a pair of Caribou, and says: "As they disappeared, I yelled at them, never expecting to see either of them again. Imagine my surprise when the old bull stepped forth from the woods above and grunted at me. I shouted again, and waved my hat, and the fellow grunted more fiercely still, and started for me. I stepped forward to meet him halfway, when back he skipped into the woods. In a moment, he was out again, and for five minutes, he and I kept up that dance."[43]

Henry Braithwaite, the well-known woodsman of Fredericton, N. B., has made a successful study of Caribou calling. In imitating their short bark or cough, he uses a birch-bark horn much like that employed for Moose calling.[44]

Antlers

To the sportsman, the antlers are the all-important matter. Compared with them, the creature's size and shape are very secondary. Just as the proverbial Red Indian was disgusted to find that he had slain a bald white man, instead of one with a showy scalp-lock for trophy, so the sportsman would rather kill a 200-pound beast with a fine head, than a 400-pounder that had dropped his antlers.

There is no species of Deer in America of which the females have not occasionally been found with antlers. Among Caribou females, however, it is the rule to wear them. In the herds of Norway, I did not see any adult females without them; but the females of the Woodland Caribou sometimes are hornless. George Linklater even tells me that about Abitibi only the barren females (*sylvestris*) have horns—that the cows carrying horns never bear young—a statement that requires further confirmation.

When among the Reindeer of Norway in 1900, I gathered much information concerning the horns of that species; we may accept it as side-

[42]Newfoundland, p. 330.

[43]Trail & Camp-fire, 1897, p. 306.

[44]N. Y. Sun, Dec. 27, 1898.

light on our own. The herdsmen assured me that 14 days after the calf is born, its horns begin to show, no matter what its sex. Old Nystuen says that in 60 years among Reindeer, he never saw one without horns.

Dr. J. B. Gilpin says:[45] "Both sexes have horns, the doe comparatively small."

According to various accounts, the bull's horns are shed in midwinter, usually in January, but often in December, if the animal be in exceptional vigour; the young bulls carry theirs till early spring; the cows keep theirs till summer is near, dropping them about the time the calf is born.

Thus it seems the does have horns all through the depth of winter, and the bucks have none. A possible reason is offered by Jens, the guide in "Three in Norway":

"In the winter, when the 'stor bocks' have no horns, the snow is often so deep that only the strongest Deer can scrape it away to lay bare the moss which at that season forms their food. Then come the does and smaller bucks, and with their horns push away the unfortunate big ones, and so are saved from starvation, while the ill-treated 'stor bocks' have to work double tides in order to get anything to eat."[46]

"Hummels," "moolys," or hornless stags are occasionally found. However, they are, as Millais says, "rarer amongst Caribou than Red-deer. Joe had only seen 2 in his life before the present example."[47] Of the females, the same author says: "Quite 8 per cent. of the female Newfoundland Caribou carry no external horns."[48]

Frederick Talcot records[49] a case of an adult Caribou buck that was hornless.

Typical antlers of male and female Woodland Caribou are shown in the Plates; also examples of the allied species.

Although these specimens show well-marked differences, the diversity of form in each kind is so great that we can find in each of the species, examples that resemble the horns of each of the other species.

During March, when the Norwegian Caribou sheds its horns, the animals spend much time on the open ice of the lakes. So that many of the shed horns fall on the ice and in time sink. Thus, the bottom of the lake is strewn with horns; these are clearly visible when it is calm. From this, we can understand why so many Reindeer horns are found in bogs.

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[45]Mamm. Nova Scotia, Proc. & Tr. N. S. Inst. Nat. Sci., III, 1872, p. 56.
[46]Jas. A. Lee and Walter J. Clutterbuck, "Three in Norway, by Two of Them," 1882, p. 269.
[47]Newfoundland, p. 254.
[48]As above, p. 319.
[49]Forest & Stream, Sept. 12, 1896, p. 203.

Record Heads

The longest pair of horns of Woodland Caribou entered in Rowland Ward's Book is in the possession of J. G. Millais, and was taken near Hudson Bay.

Its measurements are: Length, $67\frac{5}{8}$ in.; girth, 7 in.; widest inside, $44\frac{1}{2}$ in.; points, 38. (Owner's measurements.)

The largest with Rowland Ward's measurements is owned by Sir Edmund G. Loder, as follows: Length, 62 in.; girth, $5\frac{1}{2}$ in.; tip to tip, 40 in.; widest inside, $50\frac{1}{2}$ in.; points, 21 + 17; taken at Hudson Bay.

The largest of the Newfoundland race is owned by St. George Littledale. It measures: Length, $49\frac{1}{4}$ in.; girth, $6\frac{3}{8}$ in.; tip to tip, 26 in.; widest inside, 43 in.; points, 18+12.

In *Forest & Stream*, for Jan. 14, 1899, p. 26, appears the following from John W. Davis: "Burlington N. J., Jan. 5.—Editor *F. & S.*: I see in your issue of Jan. 7, the record of 13 inches, and the remarkable record of one 16-inch plow on the horns of a Caribou. I am the proud possessor of one I killed in Newfoundland, of which the plow measured, $17\frac{1}{4}$ inches."

Cartwright's oft-quoted Labrador specimen, with 72 points, is found on examination by J. G. Millais to have but "53 points."[50]

The Newfoundland antlers are noted for their many points and great palmation. Usually a prime stag has double brow shovels. These are rarely found in any other species.

Illustrations of various fine heads are given in the Plate.

In the Heads and Horns Collection, Bronx Zoological Park, New York, is a pair of Newfoundland stag's heads with antlers interlocked.

Dr. H. M. Beck supplies a photo of a Newfoundland head that has 50 to 56 points, according to your way of counting.[51]

Among the best Newfoundland heads are these recorded in Millais' book (p. 318):

Length,	$46\frac{1}{2}$	in.	Width of brow shovel,		14	Spread inside,		31	Points		45		
"	38	"	"	"	"	"	18	"	"	31	"	35	
"	36	"	"	"	"	"	$13\frac{1}{2}$	"	"	38	"	49	

The last was picked up by H. Hesketh Prichard on the Gander River in 1906. Some consider it the finest head in existence.

But the head collected by Ernest G. Asmus of Hoboken, N. J., Sept. 19, 1897, near Grandfather's Lookout, White Hills, Newfoundland, is in

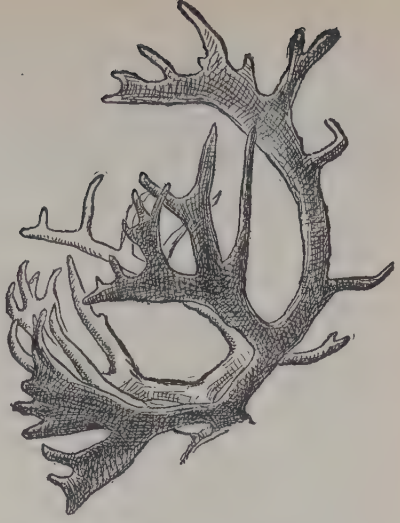
[50] Newfoundland, p. 318.

[51] Outdoor Life, Oct., 1910, p. 396.

Thirty-nine-point Caribou

Shot on the Miramichi River, New Brunswick, by Charles F. Riordan, November 13, 1898

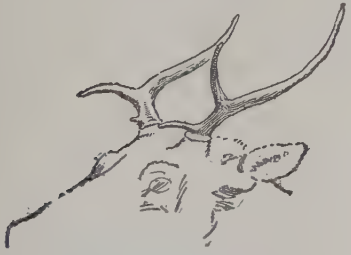
Drawn from his own photograph



A remarkable set in the collection of W. F. White, of Winnipeg, said to be from Lake Winnipeg

Beams, 34 inches long
Points, 42 in all

Antlers of female Woodland Caribou from Lake Winnipeg



Antlers of female Caribou, each about ten inches long

From a photograph of a specimen in the New York Zoological Park

By permission of the New York Zoological Society

Antlers of Woodland Caribou (male) from Rat Portage, Ontario (Winter, 1903–4)

In the collection of E. W. Darbey, Winnipeg

PLATE XIII.—WOODLAND CARIBOU ANTLERS

many respects the record (See illustration). It has 54 points, 27 on each side; is symmetrical and massive, with brow shovels 16 in. in depth.[52]

Speed, Ashore and Afloat

We have no exact data on the Woodland Caribou's speed, but I got some interesting sidelight on the speed of the Reindeer. When in Nystuen, Norway, in July, 1900, I was among the Reindeer, and lost no chance to make notes. One of the best-informed Norwegians, A. Holé, told me that the previous winter, when there was over a foot of snow, Updal, in a pulke or sled, drove his Reindeer over the ice to the east end of Utrovang and back to the house in 7 minutes by the watch. This is over $2\frac{1}{2}$ kilometres, actual government measurement, which works out at 1 kilometre in $2\frac{4}{5}$ minutes, or 1 mile in 3 minutes.

If a Reindeer of 250 pounds weight could draw 250 pounds of man and sled through the snow to cover a mile in 3 minutes, we may believe that a big wild Caribou of 400 pounds weight, and wholly untrammelled, could do even better. This is crediting the creature with amazing speed.

The speed of the Caribou when swimming is so great that it takes the best of canoe-men to overtake a vigorous buck. A good canoeist is supposed to paddle about 5 miles an hour; so the Caribou may attain 4 for a short distance, though ordinarily its speed is little over 2. Since the above was written, I have received the following confirmation from Millais. He says: "It makes two men put forth all their powers as paddlers to overtake them [the Caribou] in the water, through which they can pass at 5 miles an hour. When unmolested, they go much slower, say 3 miles an hour."[53]

There are many kinds of woodland and rough country over which the animal cannot travel afoot so fast as this. What wonder, then, that it is so ready to take to the water on every occasion.

In Keewatin, W. R. Hine had interesting evidence of this. At many places, he saw where, on coming to some rocky bluff over a lake, the Caribou had unhesitatingly toboganed down, caring nothing so long as they plumped into deep water at the bottom.

The Reindeer is not speedy when compared with the other Deer, but it keeps on so long and so straight that the hunter who follows the Caribou must be the best of travellers. The Moose may trot through the brush at the rate of 15 miles an hour; the White-tail may bound over the ridges half as fast again; while the Caribou may never rise above a 10-mile gait.

[52] Personal letter, Jan. 20, 1906.
[53] Newfoundland, p. 332.

PLATE XXIII.—THE LEAP FOR LIFE

PLATE XXVI.—MOOSE FAMILY IN EARLY WINTER

(*Alces americana* (Clinton))

The Moose, however, is satisfied when it has covered 5 or 6 miles, and has merely removed to some other part of its range; the White-tail is sure to stop after circling a mile or two and settle down again; but the startled Caribou keeps on, sometimes walking with long mile-eating strides, sometimes trotting, sometimes stopping to graze for a minute, rarely galloping or leaping, climbing hills, floundering through bogs, swimming lakes, turning aside for nothing, its lower speed offset by its persistence and directness. Very often it spends the night 100 miles from the place whence it started in the morning.

An animal with such powers and gifts is indifferent to the elements and superior to space. It dwells, moreover, in a country where man is rare, and where its food is in measureless abundance. Thus, it has little to dread from man or beast, and nothing from hunger or climate, the deadly enemies of most wild creatures. Its fellest foes are the tiny winged ones that come in thousands, as we shall see.

The Mating Craze

Early in October the rut sets in. The bulls begin to seek the cows, bellowing and fighting, much as do the Wapiti. I never had the luck to see them at this time, nor do I know any one who has. Linklater, after some years among the Caribou about Lake Abitibi, says that they are polygamous, but has seen only two or three cows with one bull.

Whether they make wallows or have any peculiar habits during this season, I cannot learn. There is great lack of information, and at best, we can do no more than fall back on analogy, and reason from the habits of the Newfoundland species.

Those who would learn of these in full and lurid detail are referred to Millais' "Newfoundland" and Dugmore's "Romance of the Caribou"—two standards that are replete with information on these very subjects.

A few extracts will serve to convey a vivid picture of these dramatic chapters in the great stag's life!

In Newfoundland, according to Dugmore, this craze, the rut, "lasts from about the 1st of October to the 15th, and, wisely enough, shooting is prohibited during this time. Were it not, the big stags would soon be killed off, as they are then practically fearless of men. Except for their heads, they are useless at this time, as the meat is unfit for food, owing to the fact that it is strongly tainted with a musk-like odour, and I am told that it is so spongy that it will not sink in water. Not until November does it regain its normal condition.[54]

[54]Life, p. 268

To this, Millais adds:

"The sign of the approaching rut is seen by their peculiar behaviour. The stag stands looking about in strange fashion. He ceases to feed except to suck up mud and water, and in the evening and early morning is seen rushing in and out of the forest in silent passion. As yet he does not grunt, but when he stops will stand and gaze for long periods at some object that may develop into a possible mistress. If the does have gone on, for at this season they make curious little migrations in any direction, he 'noses' along, following on their tracks, and stopping now and again to lick and snuff up their delicious scent. Soon he finds the object of his desire, and captures one or two wives, with whom he may stop for a short period in the little open marshes that adjoin his forest home. I am no believer in the fidelity of the Caribou or of the Moose. He rapidly tires of his wives or they of him, and though he may even 'trek' south for a short distance with the first females he has picked up, he soon leaves them and looks for fresh charmers.

"When in full 'rut,' which we may place at 11th October, he will, if a big and strong beast, gather as many as 15 or 18 does into his harem, but this is unusual, 10 or 12 being the usual limit. At this season, one constantly sees wandering troudadours, full of noise and passion, rushing madly along the hillside and simply 'spoiling' for a fight. These are large adult stags, which are much 'run,' and have just left their harem, and are looking for fresh conquests. If they meet another like themselves, or a master stag with does, a fight is certain to ensue. No Deer fights oftener or with greater savagery than the Reindeer, and they are often drowned in the bogs in their reckless passion. Hardly an adult stag is free from traces of combat at the end of October. It is common to see them scarcely able to crawl from the blows they have received, and with horns knocked to pieces. In 1904, Joe Jeddore walked up to two large stags that were fighting, and put a charge of buckshot into one of them at a distance of 15 paces. The stag, thinking his opponent had inflicted the blow, made one mighty rush at him and fell dead. The other Deer then ran forward and pounded the carcase of the fallen one, when the Indian fired his other barrel and killed the second on the top of the first.

"Even young stags fight most savagely. I watched two on the hills one day in 1906, going at each other for over an hour, until, in fact, they were both so exhausted that their blows had no power and they could only reel about."[55]

The same author also says: "In Scotland, adult Red Stags only fight

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[55]Millais, Newfoundland, pp. 326–27.

occasionally, whereas the Reindeer males all fight whenever the opportunity occurs, and their horns being more brittle than those of Red-deer, Wapiti, or Moose, they are often devoid of points or pieces of the horns at the end of the rutting season. Nearly every adult stag had a point or two knocked off by the end of October, and one stag that I observed on 3rd November had both horns broken off close to the burr."[56]

Very few writers have had the luck to witness a grand tourney of the big stags. Dugmore, however, after many months of patient watching, not only saw, but also photographed a battle royal between two superb king-bucks. I quote at length from his story. During the October of 1912, he was among the migrating and mating Caribou and says:

"In the thicker woods 50 to 100 yards away, the big stags were assembled. Their frequent bugling showed clearly that they were in a somewhat excited and nervous condition, so I continued to hope that I might see a fight before the day passed, for surely with so many stags, there must be some ready and anxious to do battle on slight provocation. It was decidedly amusing to watch the young stags. They seemed to feel themselves so important, as they strutted about, going from one doe to another, scarcely heeding the almost inevitable rebuffs or the absolute disdain with which the fair ones met their advances. Once in a while, a foolish doe would look with favour on one of these youngsters, and off they would go side by side, the stag uttering repeated grunts of satisfaction as he coaxed the doe further and further away from the herd. Their attempts were in most cases discovered before they had gone more than a few yards, and then a larger stag would instantly make for the young buck and, after driving him away at the point of the horn, would chase the erring doe back to the herd where she belonged. Sometimes the young pair would refuse to be separated, and then followed a long chase which usually resulted in victory for the smaller and lighter stag, as he could run faster. In no instance did the stags of very uneven age fight, for the young fellows evidently believed discretion to be by far the better part of valour."[57]

"One very fine one, carrying a good head, appeared among the low trees about 50 yards away. Whether or not he belonged to the herd I could not tell. He stood facing them, apparently much interested in each one that passed, but not attempting to offer any attentions to the numerous does. Nearly every one stopped a moment to scrutinize him and then pass on. Suddenly there was a snort, the new stag became more keenly alert, then like a shot from out of the trees came the big stag, the master of the herd,

[56]Newfoundland, p. 285.
[57]Romance, p. 60.

and almost before I could realize what was happening, he had struck the newcomer a frightful blow and knocked him clean over."[58]

But he sprang up and, now the fight was on.

"How their horns startled the stillness of the wilds! Each strike was echoed by the encircling woods which formed a perfect amphitheatre, surrounding the open barren as though arranged especially for the purpose of hiding the primitive fight from the eyes of man."[59]

"The pair of fighting stags seemed to be well matched. The master of the herd had the advantage of larger antlers; while the newcomer, who was darker in colour, appeared to be a rather heavier beast; they were both magnificent specimens and both intent on victory. At times their horns would be locked together in such a manner that there appeared to be danger of permanent entanglement. Then, with heads lowered, they would try to force each other backward. Every muscle was strained to its utmost, and the eyeballs gleamed white with the intensity of their passion. First one would gain a slight advantage, when the other, fearing defeat, would strain with renewed vigour and regain his loss. So they went back and forth, occasionally separating only to charge more furiously, each apparently hoping to get a better hold or, to strike a blow at the body of his adversary. But the spreading antlers are designed equally well for offence and defence; so long as the two animals are able to maintain the head-on position neither has much chance of gaining any great advantage unless there is marked disparity in point of size. The brow antler . . . is certainly an effective protection to the front of the animal's head and eyes, for it is practically impossible to pass this natural guard. At the same time, if this brow antler is well developed, it can be used to lift the other stag's head. I noticed that this happened several times during the fight, but on no occasion was there any opportunity to take advantage of it."[60]

"Now it was necessary to stand up very slowly and carefully, so as to bring the camera above the immediate foreground. With perhaps 50 Caribou within 60 or 70 yards, this was risky; however, I finally stood up and had the pleasure of seeing the two big fighting stags on the ground glass of the camera. It was a shame to disturb the two in their great struggle for supremacy, but there was no time to lose, for with so many animals about me I was bound to be discovered before long, so as soon as the focus was correct and everything examined, I pressed the button."[61] But the

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[58]Romance, p. 65.
[59]As above, pp. 66–67.
[60]As above, p. 68.
[61]As above, p. 70.

PLATE XIV.—NEWFOUNDLAND CARIBOU RECORD HEADS

Upper figure H. M. Beck's 56-point Caribou from Newfoundland (*Outdoor Life*, Oct., 1910, p. 396).
Lower figure, Ernest G. Asmus' 54-point head from Grandfather's Look-out, White Hills, N. F.

click of the camera alarmed a watching doe. She gave the danger signal, and away went the herd—fighting stags and all, to disappear in a twinkling with a sound like a storm in the trees."

By November, the rut is over, the Mad Moon wanes. Each grown female has almost certainly found a mate, and laid the foundation of a new generation.

The harems are merged with the herd and the king-buck no longer resents the approach of other bucks, big or small. Alas! he is in no shape to make a fight, if, indeed, he were so minded. He is a physical wreck. During these three weeks' frenzy he has neglected to eat. At most he has swallowed muck, and that was chiefly drink. All his bodily forces he has consecrated to the mating craze. And now he looks like a broken creature, as with belly pinched, and head low-hung, he meekly goes about and seeks the kindly recuperation that Mother Nature offers to those who eat good meals and live at peace.

The Young

In the early spring, as soon as the snow gets soft, the large bands of Woodland Caribou drift in a northerly direction, and speedily break up, the old males going off by themselves. It is interesting to note that, up to this time, the females still wear their antlers—will do so, indeed, till summer; while the old stags have been dehorned by Mother Nature in early winter. The females are, therefore, well equipped to send the males about their business in case there be any who conform not promptly to the established usage of the Caribou.

"The average period of gestation in Reindeer is 7 months and 7 days."[62] We may, then, be reasonably sure that in the Woodland Caribou it is of nearly the same length.

In late May, or sometimes early June, the mother Reindeer leaves the herd of her kinsfolk in the valley, gets away by herself to any quiet spot —sometimes on a patch of snow—and there produces her young.

The fawn is of a reddish brown, varied with white, but not spotted all over as in the true Deer. Sometimes, twins are born. In Norway, I was assured by the herdsmen that when this is the case, the mother usually destroys the second arrival.

As soon as it cleaned, the mother tries to get it on its feet. Within two hours, it can walk, though somewhat wobbly on its legs. From that time it follows her and gains strength and speed daily.

[62] Reindeer in Alaska, p. 48.

She never hides it or leaves it, as do some of the Deer. If, by chance, the mother and fawn are separated, she grunts till it replies, and they again come together.

This brief history of the calf refers to the Norwegian Reindeer, but there is every reason to believe that the account would apply, word for word, to the Woodland Caribou.

Concerning the close association of mother and fawn, Chauncey J. Hawkins writes:

"Wherever I went, I was greatly impressed by the difference in the actions of the fawn of the Caribou as compared with the young of the Red-deer and the Moose; neither of which latter, of course, is found in Newfoundland. It is seldom that a fawn of a Red-deer will be seen feeding with the mother at the edge of a lake or stream. The little thing is carefully hidden away in the brush before the mother ventures into the open country. The cow Moose will compel the calf, if possible, though these calves are often very hard to discipline, to lie in a clump of alders while she feeds in the lake. But the fawn of the Caribou follows the mother wherever she feeds. It fords the streams, swims the lakes, ventures into the open country, and seldom leaves her side—perhaps can follow her over a bad bog."[63]

In the country around James Bay, Miles Spencer says that it is suckled for two months, and weaned by the 1st of September.[64]

Food

Dugmore says: "The life of the Caribou during the winter is regulated almost entirely by the food supply. So long as the weather is fairly 'open,' they continue to eat the various ground mosses and lichens (the principal kinds being *Cladonia rangiferina*, several species of *Cornicularia* and *Cetraria*, *Stereocaulon pascale* and *Bryopogon jubatum*). These, when not too heavily covered with snow, are obtained by digging with the hoofs and not by using the nose for a snow shovel, as some people claim. During the very heavy falls of snow, all ground food is hidden from them, they must then turn to the tree-growing mosses, such as *Sticla pulmonaria* and the common *Usnea*, or Old Man's Beard, which hangs from the trees in graceful wind-blown festoons as though arranged especially for the hunger-driven creatures—a manna in the time of greatest need."[65]

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[63]Recreation & Outdoor Life, Aug., 1914, p. 77.

[64]Low, Expl. James Bay, Can. Geol. Surv., 1888, App. III, p. 765.

[65]Romance, pp. 38–39.

In Norway, they assured me that on Reindeer ranges young trees never grow, as the Deer crop these first of all by preference.

Although I doubt not the Caribou eats anything a Deer or a Moose will eat, the following item by Dugmore was a surprise:

"A herd of several Caribou swam across the river near where I was hidden, and coming to the lily pads, immediately began eating the large leaves. The water was over 4 feet in depth, so the animals could not touch bottom. They bit off the leaves as they swam about, frequently putting their heads entirely under water in their efforts to get possession of a submerged leaf. For over half an hour they continued their feast."[66]

The Barren-ground Caribou lives chiefly on moss, but the Woodland species is more nearly omnivorous, as most green things are in its diet. In Norway, the Reindeer is said to eat the Lemmings, or Moss-mice, but I find no record of such a depraved habit in any American species.

J. B. Burnham supplies the following curious observation on the slush-eating habit of the Caribou: "All through the winter, the ice cracks, and water comes up through and melts the snow. Caribou like to eat that, and that is the reason they come on the lakes."[67]

The Watchful Leader

Notwithstanding the physical domination of the big stag, as already set forth, there is a good deal of evidence that, as in most polygamous ruminants, the real leader of a band of Caribou is an old doe. Thus, Dugmore says:

"As a rule, each band is led by a barren doe; occasionally, but very rarely, a stag is the leader. Out of about 80 herds, I saw only one led by a stag. The large stags are apt to travel in the middle of the line, sometimes even bringing up the rear."[68]

Similarly, Millais observes: "Nearly every company had a 'watch' doe, which did not feed, but kept gazing in different directions all the time." And again:

"Immediately the leading doe gives the signal of alarm, the stag is the first to appreciate its true import. The does are full of curiosity, and wish to stop and gaze at the strange individual; but the stag knows only too well what the danger is, so he bends his neck, rounds up his harem, and rattles them off at full gallop whether they wish it or not."[69]

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[66] Romance, p. 31.

[67] Forest & Stream, March 18, 1899, p. 208.

[68] Life, p. 269.

[69] Newfoundland, p. 281.

Curiosity

Provided he does not smell them, the Caribou is mightily attracted by strange appearing objects. John B. Burnham supplies a case in point. He was travelling across a bog in Alaska and suddenly "spied two Caribou 40 or 50 rods away. In a jiffy," he says, "we had dropped our loads, and just about then the Caribou sighted us, and ran up a little nearer to investigate. . . .

"The doctor wore a red toboggan cap, which seemed to interest the Caribou immensely. They trotted first to one side and then to the other to try and get a good view of this. Red caps evidently were a novelty in the burnt lands."[70]

Erratic Character

In character, this creature is a strange mixture of wariness, capriciousness, and stupidity. One never knows just what the Caribou is going to do next, but may be sure that the animal is going to do it with amazing energy and persistence.

I once had an adventure with a Caribou which, though slight and unromantic, might have cost me my life. It illustrates the uncertain temper of the animal, and the energy with which it can act on occasion.

About 1889, P. T. Barnum had secured a fine bull Caribou from Maine, and brought it, wild-eyed and sullen, to Madison Square Garden, NewYork. As soon as I heard of its arrival, I wrote for permission to make some studies. Receiving this, I went to the Garden. The keeper in charge was as sulky as the prisoner. The letter of the manager barely secured attention.

"You'll find him there," and he jerked his head toward a dark stall.

"That won't do," I said. "I am here to sketch him, and must see him."

"Well, suit yourself."

Proceeding to do so, I got a long rope halter on the creature's neck. The keeper, seeing me about the risky business of leading the Caribou into the ring, and knowing that he would be held responsible, got another long halter, and together we brought the animal out where he could be seen.

There was nothing to tie him to, so we had to stand holding the ropes, and be ready to pull in different directions. In order to have my hands free for sketching, I tied the rope around my waist. Soon the keeper got very weary of his task. The clowns in the next ring were practising for the afternoon performance, and he turned to watch them.

[70]Forest & Stream, Feb. 13, 1897, p. 125.

The Caribou seemed to see its chance. Giving a great bound, it jerked the rope from the keeper's grasp and dashed the length of Madison Square Garden, dragging me by the rope which was tied about my waist. I rolled over many times, but, after about 50 yards, got my heels into the sawdust and my hands on the rope. The circus people did nothing but laugh and jeer as the powerful brute lunged along; but the keeper, realizing that he was laying up trouble for himself, came to the rescue and caught the end of the other rope. Whereupon, the Caribou changed his behaviour, and stood perfectly still, with head down, as though he were quite a different animal.

Winter Life

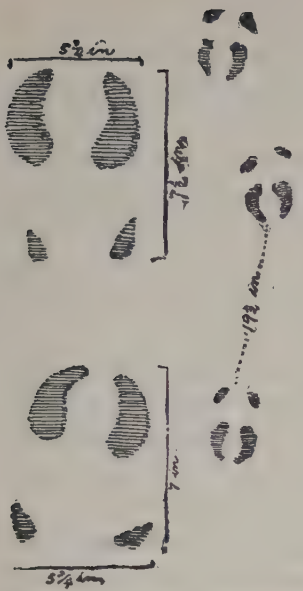
The great crisis of the rut is over. Normalization sets in; and when the snows grow deep in December, the Caribou, stags and all, are fat once more and well-favoured. No longer does the great stag manifest bitter hostility to all other stags, both great and small; but associates with two or three as good as himself, that, with a dozen uninteresting does and yearlings, now unite to form the winter band. Five to twenty are commonly seen together at this time. Thus, the species is quite gregarious; yet but slightly sociable, since individuals rarely combine their efforts for a common cause.

This is the real and only right season of the chase. A sportsman, Charles A. Bramble, has given us at once a lively sketch of hunt and of hunted as herewith:

"In some respects, the Caribou is a very shrewd animal; in others, a perfect fool. It does not trust to its eyesight, and will almost blunder against a man should there be no taint of his presence in the air. But its sense of smell is very acute, and upon that sense it relies mainly for its protection.

"Caribou usually travel through the woods at an average pace of 4 miles an hour, and hardwood ridges are preferred to the heavier spruce lands and mixed growths. All the hunter has to do upon finding fresh tracks, is to follow them at as good a pace as he can command, keeping a very sharp look-out ahead. Of course, every precaution must be taken to prevent the animals getting wind of the hunter, but as a general thing they always travel up wind, knowing that against all ordinary dangers this gives them the greatest measure of protection; therefore the taint of the hunter's presence will hardly reach the Caribou, at least while they are travelling.

"Should the game be viewed while passing along an open hardwood ridge, the hunter must stand as still as a statue, and not move until the game is out of sight. Following slowly, the animals will at length disappear into some belt of mixed growth. This is the hunter's opportunity. He



Tracks of Woodland Caribou on Athabaska River, October, 1907

The paces vary from 20 to 40 inches

Right hind foot of Newfoundland Caribou

From specimen No. 414, Field Museum, half natural size. Specimen taken in September, so that the frog is not yet absorbed

PLATE XV.—CARIBOU DETAILS

should force the pace, keeping his rifle ready for a snap shot, and on once more coming up with the animals he ought to be within easy range of at least one of them.

"On the barrens, the Caribou feed during the morning and afternoon, and probably at night, but during the middle of the day are fond of basking in the sunshine, and a herd discovered under these conditions, is easily approached."[71]

Enemies: Beasts and Birds

Leaving out man, the ruthless and the worst of all, the following are destroyers of Caribou. The Bear, according to some, must be listed. Frank H. Risteen says of Henry Braithwaite that in New Brunswick, "he examined the stomachs of all the Bears he killed, and found abundant evidence that Caribou veal is a favourite article of Bruin's bill of fare."[72]

But the evidence shows that only the very young Caribou could be caught by a Bear. This limits the damage to a few days in May or June; it is therefore small.

Wolves kill fawns of the Barren-ground Caribou and sometimes get the adults; but the great speed of the latter usually puts it beyond reach even of the Wolves. The Wolf damage among Woodland Caribou cannot be heavy.

In Norway, the herdsmen assured me that Wolverine commonly follow the Reindeer herds to pick up stragglers, and added this curious observation: The Wolverine follows the Reindeer band. If they go straight on, he cannot get one. If they change their line of travel, the calves are so left *outside the band*. Then the Wolverine gets one of them. It bleats loudly, but the herd runs away. If *in the herd*, they would defend it.

This, if true, applies equally no doubt to our own species.

Foxes, Lynxes, and eagles may occasionally kill a young fawn, but the opportunity to do so must occur seldom.

Weather and Forest Fire

Occasionally, a rare combination of weather conditions proves fatal to many. Thus Millais says:

"When Reindeer are caught in isolated positions, such as small islands and ranges of mountains, by one of these sudden frosts following a thaw, and there is no chance of escaping to less exposed places, the whole stock die of starvation. Such a calamity occurred on the Upper Laerdal mountains

[71] Rod and Gun in Canada, Oct., 1900, p. 342.

[72] Forest & Stream, July 29, 1899, p. 87.

in 1892, and on several islands in the north of Hudson's Bay some years ago, and I could name other instances."[73]

Another occasional but overwhelming disaster is set forth by Prof. H. Y. Hind in his "Exploration of Labrador." He describes at length the "Dark Days of Canada," when for days together the sky was darkened with smoke from an unknown cause. These occurred in October, 1785, and again in July, 1814. They were at the time supposed to be caused by a volcano in the unknown interior of Labrador. But no such volcano exists, and Hind is "inclined to the opinion that the 'Dark Days of Canada' were the result of a vast conflagration in the interior of the Labrador Peninsula, and that the materials which assisted most in feeding the fires were the lichens and mosses which grow in such rich and extraordinary luxuriance and beauty in that desolate country."[74]

He then describes the sweeping fury of such a vast calamity, and leaves us in no doubt that it must have wiped out all terrestrial life within its scope, including the Caribou.

Insects and Disease

But such continental disasters are rare; and the real enemies that hold down their numbers are of the small and ever-present type—mosquitoes, which blind and persecute them all summer, bot-flies or bulldog flies which breed maggots by the hundreds in their skin, tapeworms disseminated by carnivores, screw-worms, lung-worms which wreck their lungs, round-worms which sap their vitality, nose-flies that drive them mad with pain; and a number of diseases. These are the burden of the Caribou.

It is well known that in sunny weather the Caribou seek out the snow banks, and stand or lie on them for hours. Henry Bannon, the well-known sportsman, says, discussing the Cassiar Caribou: "The theory of the Indian is that the Caribou stands on the ice and snow to keep cool. . . .

"Others believe that the Caribou seeks the ice and snow to avoid the black flies and other insect pests. Such pests are not so plentiful over the ice as over the grass. I have seen Caribou, while feeding along, shake their heads vigorously and frequently for the apparent purpose of ridding themselves of insects. And it is for that purpose that they roll on the snow and run from one snow bank to another."[75]

Dillon Wallace says: "Natives in the north have told me of Caribou having been worried to death by the insects, and it is not improbable.

[73]Newfoundland, p. 322.
[74]Explorations in Labrador, 1863, I, p. 262.
[75]Forest & Stream, Sept., 1920, p. 485.

The 'bulldogs' or 'stouts' as they are sometimes called, which are as big as bumblebees, are very vicious, and follow the poor Caribou in swarms."[76]

These things, their causes and remedies, as well as the diseases that afflict this helpless sufferer, are duly and fully set forth in Bulletin No. 1089, issued by the U. S. Dept. Agri., 1922.

A simple hygienic habit noted in many Deer is the making of wallows. Yet Millais says: "Caribou do not make 'wallows' like other species of Deer. In late September, the stags often stand on little mounds and scrape away shallow pits with their feet, generally in spots where some doe has been and left traces of her presence. This habit is very similar to that of the bull Moose, but I have never seen the pits so deep as those made by the larger Deer."[77]

Strange Instances

In the Abitibi country, and doubtless elsewhere, the Woodland Caribou has the habit, also ascribed to the Moose, of racing in a circle during a windstorm. George Linklater tells me that he has witnessed this several times. Reference to the Elk and others of the family will show this habit to be widespread.

Martin Hunter, the old Hudson Bay trader, furnishes an interesting case of Cattle running wild with Caribou. Reminiscing of his early days in Labrador, he says that a consignment of five 3-year-old steers on the hoof arrived at the Post as the winter ration. Two of these escaped, and apparently deemed that the Caribou were their nearest kin, so joined a herd of the same.

"The following winter in February, a party of hunters came in from the headwaters of the Moisie River, 150 miles north of us, and they reported having killed our Cattle among a small herd of Wood Caribou. To prove their story, they produced the horns which they had brought down all those miles on their toboggans as visible proof. . . .

"The chief informed me they were so fleet of foot that the 5 Deer were come up with and killed before they overtook the steers, which were rolling fat, sleek of coat, and had an undergrowth of wool such as the Deer had, showing that under different circumstances nature had given them this protection against the severity of the climate."[78]

Dugmore records and photographs a remarkable case of a stag that "died from a bony growth on the horn which penetrated the brain."[79]

[76]Long Labrador Trail, 1907, pp. 74–75.

[77]Newfoundland, p. 327.

[78]Forest & Stream, Aug. 25, 1906, p. 291.

[79]Romance, Plate opp. p. 62.

Charles A. Bramble writes that "to the writer's knowledge, a Caribou in the month of September attacked fiercely a gray Horse, which was harnessed and passing along a lumber road, and had to be driven off by a light charge from a shotgun.

"On another occasion, 7 men were walking in Indian file through the woods, when a young Caribou cow came galloping towards them, showing the liveliest curiosity. There was no breeze, and she was not more than 15 yards from the procession when the leader put a bullet through her heart."[80]

An extraordinary Caribou ride is thus detailed by George Gillard. It took place during a hunt in Newfoundland in 1891. He says: "I was hunting in the vicinity of Indian Lake when I noticed 5 Caribou crossing the lake. I selected an old stag for my mark, and just as they landed, I fired. The shot entered the side of his head and he ran about a mile before falling. I followed and found him apparently dead, stretched out on a marsh. As I straddled him to cut his throat, the knife having passed entirely through it without him moving, he bounded up, with me on his back, and away he went like the wind. He ran about 200 yards, dropping the knife out of his throat in his mad career. I held on to him until I found a favourable opportunity to drop off, when I returned for my rifle. Then I followed him up till I got a second shot. This time I made sure work."[81]

J. G. Millais gives the following: "My friend, Mr. John McGaw, witnessed an interesting exhibition of the playfulness of this animal [the Fox] shortly after he left me, on my third journey. He was stalking two stags on Serpentine Hills, near the Gander, when he noticed one of the stags staring stupidly and backing away from some object which kept leaping up from the ground at its side.

"On approaching to within 80 yards of the Deer, he saw that the curious object was a young Fox engaged in an attempt to make the larger animal have a game with him. The Fox repeatedly sprang into the air, snapping at the Deer's side, and then, as these manœuvres were resented by the stag lowering its head to strike, it rushed round to the other side to repeat the performance. The nimble game went on for several minutes, Reynard apparently enjoying the fun of chaffing his clumsy friend, who did not appear to appreciate the joke in the slightest degree. Sometimes it bounded forward as if to seize the stag's nose, and then as quickly sprang backwards, standing just out of reach in the most provoking manner. My readers will be glad to hear that this merry little fellow retreated in safety."[82]

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[80]Rod & Gun in Canada, Oct., 1900, p. 342.
[81]Recreation, Jan., 1898, p. 3.
[82]Newfoundland, pp. 302–03.

The Domestic Reindeer in America

The great service rendered to man by the Reindeer of Lapland is well known; and the realization that we had in America a Lapland of our own, led long ago to a plan for establishing the Caribou as a range animal on this continent.

About 1840, the Hudson's Bay Company sent a few Reindeer in charge of some Norwegian herdsmen by way of Hudson Bay to Red River. They wintered at the place since named Norway House. Here all the Reindeer died.

In 1882, Alexander MacArthur, of Winnipeg, wrote a paper on the introduction of Reindeer to the Northwest. The paper was read before the Manitoba Historical and Scientific Society. The idea was favourably entertained, and the necessary capital subscribed to secure a few domesticated Reindeer from Sweden. But it chanced that the time of year was not just the most favourable for the importation, so that prudence dictated a few months' delay. During that time, interest in the project subsided, owing chiefly to the general panic in business matters which occurred. Nothing further was done in the matter, and finally the capital was redistributed.

The first successful introduction of Reindeer was arranged by Dr. Sheldon Jackson, U. S. General Agent of Education in Alaska. With the political backing of the Honourable Henry M. Teller, government support was obtained, and the first importation of Deer, 16 head, was made. They reached Amaknak Island in the summer of 1891. Other and larger importations were made from time to time. Experienced Reindeer men were engaged to teach the natives of Alaska. The project is now a great success. Not less than 200,000 Reindeer are being handled on Alaskan ranges to-day.

In January, 1908, Dr. Wilfred T. Grenfell landed 250 Lap Reindeer in northern Newfoundland near St. Anthony. These did well for a time; then disease broke out and reduced their number. The herd was given to the Canadian government, which took it to the north shore of the Gulf, and recently moved it to the Island of Anticosti, where it now is.

Towards the end of October, 1921, a herd from Norway was landed at Amadjuak, Baffin Island. These were brought by the Hudson's Bay Company as stock that might utilize the great unpeopled stretches of northern Canada.[83]

According to Albert Stoll, Jr., Secretary of Conservation Commission of Michigan, that State has decided to experiment with Reindeer on its

[83]Capt. E. A. Watson, Illus. Can. Forestry Mag., April, 1922, pp. 713–14.

denuded timberland. On March 10, 1922, they brought, via New York to Michigan, a herd of 60 Reindeer—50 cows and 10 bulls—paying $125 each. All were landed in safety. The herd, now (Dec., 1922) numbering 81, is kept at Mason State Game Farm, and promises well.[84] Later I learned that the attempt ended in total failure.

Those who wish fuller information are referred to the Reference list at the end of this Life.

The Reindeer Age

The Reindeer has always been an important animal to our race. The dawn of human history is known as "The Reindeer Age," because, at that time, the Reindeer was the most numerous large animal in Europe, and the chief support of man. The bone-caves and lake-beds of southern Europe abound in Reindeer remains.

The cave-man who hunted the Reindeer, though a naked savage, had a wonderful feeling for art. He was the inventor of etching, and has left us many pictures of contemporary life, on bone, slate, and ivory, made with that most primitive of gravers, a sharp-pointed flint.

These pictures are the earliest-known efforts in art. The most ancient monuments of Egypt, Assyria, and China were probably built thousands of years after the stone man had accidentally buried these etchings in the midden heaps of his camp.

They are priceless and unimpeachable records of life at the time, in the one universal writing. They are, moreover, fair in drawing, good in composition, and masterly in character. No one needs to be told that the man who drew these animals had been familiar with them from his youth. Many species, from birds and snakes to elephants and men, are represented, but the best of the drawings always are those of the Reindeer.

Among these, the palm is given to the Kesserloch etching on a piece of Reindeer antler. The reproduction on p. 112 is full size. At first sight, one may be disposed to question the drawing of the hind legs and the incurved line of the belly. But a reference to the habits of the living animal shows that these parts are correctly represented. During the rut, as we have seen, the buck Reindeer are so devoted to the present engrossments that they even neglect to eat; and the late fall sees them spent in strength, worn out, and emaciated. They are then so weak that they are easily destroyed by Wolves and other enemies. From these they seek refuge in the bogs and marshes, where their own natural gifts are guarantee

[84] Reindeer in Michigan, American Forestry, Dec., 1922, pp. 755–57.

of safety, until the frost makes firm ground of all; by which time the stag has regained his vigour.

The full-sized antlers and the long beard show that this was the season in the cave-man's drawing. The pinched-up belly, the tottering hind legs, and the truthful rendering of the marsh all go to show that he was depicting something that he had seen with his own eyes; and that his Reindeer, indeed, was much the same as ours to-day, though he and the beasts he etched passed on ten thousand years ago

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LIFE XLV—BARREN-GROUND CARIBOU

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CARIBOU ATTACKED BY WOLVERINE ON A FIRE-SCREEN ..... E. T. SETON

Barren-Ground Caribou, Arctic Caribou, Reindeer, Arctic Deer

Rangifer arcticus (Richardson)

(*Rangifer*, see ante: L. *arcticus*, arctic)

Cervus tarandus, var. *arctica*, Richardson, 1829, F. B. A., I, p. 241.
Rangifer arcticus Allen, 1896, Bull. Amer. Mus. Nat. Hist., Vol. 8, p. 234.

Type Locality—Fort Enterprise, Mackenzie, Canada

Eskimo, *Took-too.*
Chipewyan, *Et-then.*
Dog Rib, *Ek-wó Wetsi.*
Loucheux, *Vuth-zi.*
Slavey, *No-ti.*
Cree, *Ah-tik.*

In addition to the generic characters of *Rangifer*, an Arctic Caribou taken by myself in Northern Canada gave the following details:

Size. Adult ♂ collected at Last Woods, Artillery Lake, Northern Canada, August 2, 1907: Length, 76 in. (1927 mm.); tail, 6 in. (152 mm.); hind foot, 20½ in. (520 mm.); height at shoulder, 43 in. (1090 mm.).

Adult ♀ taken Aug. 25, 1907, at Aylmer Lake, Mackenzie: Length, 67 in. (1698 mm.); tail, 5 in. (127 mm.); hind foot, 20 in. (507 mm.); height at shoulders, 36 in. (913 mm.).

A yearling ♂, that is, 15 months old, taken at Last Woods, Aug. 3, 1907, gave: Length, 57 in. (1446 mm.); tail, 5¼ in. (133 mm.); hind foot, 18½ in. (470 mm.).

A ♂ fawn, collected by myself at Artillery Lake, Aug. 2, 1907, and probably 2 months old, is as follows: Length, 39¼ in. (995 mm.); tail, 4 in. (101 mm.); hind foot, 14¾ in. (375 mm.).

Weight. The adult ♂, above, weighed 270¾ lbs. Hanbury gives the weight of a "run-down" bull at 295 lbs.; and believes that, in prime condition, it would have been about 400 lbs.[1] Capt. F. L. McClintock records

[1]Northland, p. 49.

a buck taken near Port Kennedy on North Somerset, Oct. 2, 1858, at 354 lbs., minus the paunch.[2]

The adult ♀, Aug. 25, without blood and much paunch matter, weighed 149½ lbs.; therefore about 175 lbs. alive.

A yearling ♂, taken Aug. 3, weighed 105 lbs., without blood and about 10 lbs. of stomach contents; that is, its weight was about 120 lbs. Another yearling, taken about the same time, weighed 92¼ lbs. without blood; probably 100 lbs. alive.

A 2-months fawn, taken Aug. 3, weighed 40¾ lbs. without blood.

Colour of Adult ♂, taken at Artillery Lake, Aug. 2, 1907 (therefore in summer coat): In general, umber or Caribou brown, darkest on the back, paler on cheeks, on band along flanks, on fore neck, throat, and outside of the legs. Belly, disc, underside of tail, and the half-inch fringe above each hoof, pure white; a pale ring about each eye. These colours are much patched over with rags of the pale winter coat still hanging on. The tuft inside the tarsus is brown, but slightly paler than the surrounding hair.

Adult ♀. The above colour description fits exactly the ♀ taken Aug. 25, except that the ♂ is a little darker on the back.

The horns of the ♀ are in gray-brown velvet, with markings of dull white.

Winter Coat. A large ♀ (No. 19502 Am. Mus. Nat. Hist.) taken by Capt. George Comer from near Wager River, northwest coast of Hudson Bay, is a superb specimen in full winter robe; the hair on the back being about one inch long, on the belly 2½ in., and on the neck-fringe 6 in.

It illustrates also the winter colour. In general, it is of a clear, yellowish white, strongly tinged with yellow on the sides, shoulders, and belly; and pure white on the throat-fringe, and between the hind legs. The back and body show the usual Caribou blanket of dark umber-gray, but much frosted by overlying whitish hairs. The head also is gray, becoming Caribou brown on the muzzle; the end of the nose is covered with the usual patch of yellowish white. The legs are Caribou brown in front and on the outside; otherwise white. The tail is, as usual, white with the brown of the back running out on the top to near the tip.

The general impression is of a creamy white animal, with a gray blanket on its back.

Colour of fawn, taken Aug. 2, 1907. Although so young, it shows already the colours of the adult. The baby wool sticks to its ribs, flanks, and head, in flakes and patches, but the under colours dominate; that is, all above, it is of a warm dark grayish brown, showing almost a purplish tinge

[2]Voy. Fox. p. 184, Boston ed.

in some lights, shaded into grayer, lighter brown on the sides; and on all the under parts, dull white, which becomes clear white on the stern disc, and on the under side of the tail.

The legs are tinged with yellowish brown, and the white fringe above each hoof is so slight that it must be sought for. The brown is very dark around the eyes and on the upper side of the nose; the end of the nose is white. The baby fur, still on the head, is strongly tinged with sienna.

At birth, the fawn appears in a spotted or dappled coat, as do most Deer, but the spots are large, few, and dim compared with those of the *Odocoileus* and *Cervus* groups; and they are lost sooner than with these species.

Races

The following races of the Barren-ground Caribou have been recognized:

arcticus Richardson, as already set forth. T. l., Fort Enterprise, Mackenzie.

groenlandicus Gmelin, a small race of pale colours, and very slender antlers. This having been first described, might be considered the type of the American forms. T. l., Greenland.

stonei Allen, a large animal, nearly 4 ft. at the shoulder, with general colour very dark, except on the neck, which is covered with a long mane of pure white. T. l., Kenai Peninsula, Alaska.

pearyi Allen, a small species, pure white except for a gray patch on the back. T. l., Ellesmere Land, lat. 79° north.

granti Allen, much like *stonei*, but without the white mane on the neck. T. l., Western end Alaska Peninsula, opposite Popof Id.

excelsifrons Hollister, known only by a skull which has a remarkable domed forehead. T. l., Mead River, near Pt. Barrow, Alaska.

caboti Allen, much like *arcticus*, but with horns sweeping backward level, then up at right angles. T. l., 30 miles north of Nachvak, eastern Labrador.

ogilvyenis Millais, more like a small *osborni*, larger and darker than *arcticus;* T. l., Ogilvy Mts., Yukon, Canada.

History

In 1497, Sebastian Cabot discovered "Prima Vista"; and found on it "White Beares and Stagges farre greater then ours."[3] This is now identified

[3]Purchas, Pilgrimage, 1617, p. 915.

as Newfoundland; therefore, the Newfoundland Caribou was the first discovered of the American species.

In 1576, Sir Martin Frobisher discovered Frobisher Strait or Bay on the west side of Davis Straits. "Hauing entred three-score Leagues, hee went on shore, and was encountred with mighty Deere, which ran at him, with danger of his life."[4] This is the first mention I find of the Barren-ground Caribou.

In 1605, James Hall, exploring Greenland, records that he saw "no beasts but blacke Foxes, and Deere."[5] This is the first mention of the Greenland form.

In 1609, Marc Lescarbot lists Caribou among the principal Beasts of the Chase in New France.[6] This introduced the Woodland species to printed notice.

Purchas tells[7] of a whaling voyage to Greenland by Jonas Poole in 1611, in which is again noted the Greenland Caribou. He says: "They found many fat Deere, many white Beares, with white, gray, and dunne Foxes."

These are the early references that introduce our Caribou to the lay world. Their scientific presentation was much later.

In 1788, J. F. Gmelin in his *Systema Naturæ*, Vol. I, p. 177, recognized the Greenland Caribou as distinct from that of Lapland, and named it *Cervus tarandus groenlandicus*.

In 1827, Cuvier[8] listed the American Caribou as:

1. The Caribou of the Woods; 2. Great Caribou of the Rocky Mts.; 3. Labrador or Polar Caribou.

In 1827, Sir John Richardson penetrated central Northern Canada, became acquainted with the Barren-ground Caribou, and in 1829,[9] described it as *arcticus*.

By all the rules, then, *groenlandicus* is the type of the American forms of Arctic Reindeer, and should be taken as the starting point. But it is so rare and little known, that I make the well-known and abundant *arcticus* the subject of this Life, and compare the others with it.

Range and Haunts

A map of North America, showing those parts of the Arctic region that have land not covered with ice in the summer, would be an exact map of the

[4]Purchas, Pilgrimage, 1617, p. 916.
[5]As above, p. 920.
[6]Histoire de la Nouvelle France, 1618, p. 896.
[7]p. 922.
[8]Anim. King., Vol. V, p. 305.
[9]F. B. A., I, p. 241.

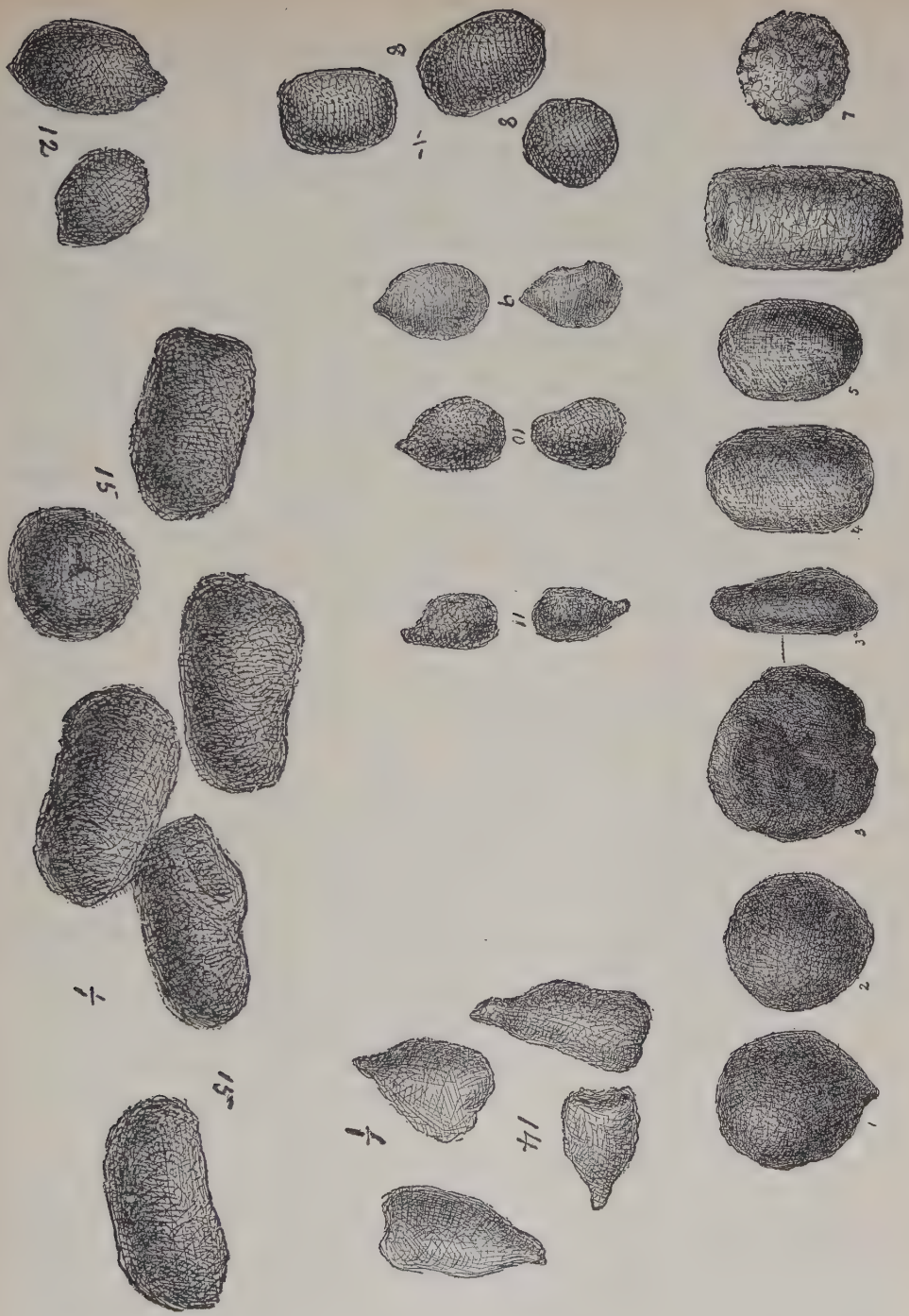

PLATE XVI.—SCATOLOGY OF THE DEER

Pellets all natural size, 100 to 200 at each place

Wapiti.—1–7; 1 and 2 spring pellets; 3, summer, all green grass; 4 and 5 autumn, dry grass and twigs; 6, winter, nearly all woody fibre; 7, gravel and sand, doubtless swallowed medicinally.
Mule-deer—8–11; 8–8, buck; 9, 10, adult, probably doe; 11, fawn.
Whitetail.—12, not distinguishable from those of Blacktail, and sometimes as large as those of Wapiti.
Caribou.—Group 14, Athabaska River, Oct. 30, 1907.
Moose.—Group 15–15; though sometimes confluent in green grass season, these are typical and easily known.

summer range of the Arctic Caribou in its various races. The Hudsonian belt or region of stunted trees, is, roughly speaking, the winter range of those species to which it is accessible. This excludes only *pearyi* and *groenlandicus*.

E. A. Preble's map[10] shows that the Polar Caribou are found on all the Polar islands of Northern Canada up to latitude 80°, and beyond that up Kennedy Channel to the Arctic Ocean; but not on the portion of Ellesmere which is called Grantland, nor on Axel Heiberg Island.

Greely writes of it: "The Reindeer, formerly a habitant of North Grinnell Land, has evidently retreated southward many years since.

"Lieut. Gifford, May 19, 1876, picked up an antler in 82° 45′ N., and horns were found at Thank-God Harbour in June, 1872. Probably a dozen antlers were gathered in the vicinity of Fort Conger, and as many more in the interior of Grinnell Land in the valleys near Lake Hazen; but no traces of a living animal could be found. Much to my surprise, I picked up a scrap of Reindeer skin about an inch square in a valley to the westward of Lake Hazen.

"It is more than probable that a herd may yet exist in the vicinity of Rawling's Bay." [80° 27′ N.][11]

This Deer is a creature of the open plains of the Arctic Circle. Avoiding rugged mountains and thick woods, it lives up to the literal meaning of its name "Pasture Beast." In its winter life, it does indeed enter the slim woods of the Northwest forest belt; but even here selects the more open places, and congregates in great herds, chiefly on the unbroken, level surfaces of frozen lakes.

There is probably no other animal on our list with a wider, more indefinite home range. In the month of June, for 2 or 3 days, when the newly born fawns are able to follow the mother but slowly, it is quite sure that each mother has a very small fixed home range. But at all other times, on the plains, the life of a Caribou is one of continuous travel.

Concerning the extent of its winter range in the woods, I have no details.

Antlers

The Caribou are *the* antler bearers, above all other Deer. Not only do the males have larger antlers in proportion to their bulk than the rest of the family, but most female Caribou also have them. In the Plates, are given typical antlers of male and female, some remarkable pairs, and finally a number of freaks.

[10] Athabaska Mackenzie Region, N. A. F., No. 27, 1908, p. 138.

[11] 3 Years, 1886 ed., II, p. 363.

In the Life of the Blacktail Deer, will be found set forth at length some of the causes of freak horns. The remarks therein undoubtedly apply to Caribou and all other Deer.

The facts that the Caribou female has horns, and that horns reflect the condition of the genitals, open a new field for observation. Why are some female Caribou hornless? In what way does barrenness affect the horns?

Usually, the antlers of the prime bucks are dropped about the last week of December. Sick and immature bucks shed a week or two later, and are similarly behind in the rest of the stages. Frank Russell writes that in March and April, 1894, in the Coppermine region, he found large numbers of buck Caribou still carying their antlers.[12] It would be interesting to know whether this had been a year of general suffering.

By about the last of March, normally, the new horns have appeared. In a few days, they are an inch long. Their development is so rapid that they are full grown about Aug. 1st, hard set by Sept. 1st; cleaned, polished, and ready for war by October.

The cows shed in the middle of April, but are fully equipped with their new horns when late October comes with rutting time.

Record Heads

To list the record heads is not easy, since the various species are not distinguished in Rowland Ward's Book.

The longest (*granti*) in the Reed Collection at the Bronx is given: Length, 62 in.; girth, $8\frac{3}{4}$ in.; outside width, 50 in.; points, 9+15. It is from Alaska.

The next of the same species, same place and collection, gives: Length, 60 in.; girth, $7\frac{1}{4}$ in.; width outside, $43\frac{1}{2}$ in.; points, 20+14.

Next listed is Dr. W. H. Chase's Kenai head: Length, 60 in.; girth, 6 in.; width inside, $50\frac{1}{2}$ in.; points, 43.

Totalling these features after allowing 4 more to the last to balance the inside measurement of spread against the outside of the others, we find the Chase head in first place with a value of $163\frac{1}{2}$ and the other two equal with $144\frac{3}{4}$ each.

I should not consider this appraisal final, because it takes no account of symmetry or palmation. I should prefer to add 1 to 5 points for each palm, and up to 20 points for symmetry; but have not the necessary data at hand.

[12]Far North, 1898, p. 225.

The Weather-proof Coat

The Northern Caribou is so highly specialized that one is prepared to find its coat endowed with many peculiarities. Richardson, who lived with these Deer the season round for several years, writes:

"In the month of July, the Caribou sheds its winter covering, and acquires a short, smooth coat. . . . The hair at first is fine and flexible; but as it lengthens, it increases gradually in diameter at its roots, becoming at the same time white, soft, compressible, and brittle, like the hair of the Moose-deer. In the course of the winter, the thickness of the hairs at their roots becomes so great that they are exceedingly close, and no longer lie down smoothly, but stand erect; and they are then so soft and tender below, that the flexible, coloured points are easily rubbed off, and the fur appears white, especially on the flanks. This occurs in a small degree on the back; and on the under parts the hair, although it acquires length, remains more flexible and slender at its roots, and is, consequently, not so subject to break. Towards the spring, when the Deer are tormented by the larvæ of the gad-fly making their way through the skin, they rub themselves against stones and rocks, until all the coloured tops of the hair are worn off, and their fur appears to be entirely of a soiled white colour."[13]

Senses

When an animal lives in the wide-open country, with need and every opportunity for far view, it is usually keen-sighted. Antelope, Giraffe, and Mountain Sheep are instances. Yet, the Caribou seems to have poor vision. Again and again, I have had them come sniffing up toward me, in doubt as to whether I was rock or Caribou, until I moved; or better still, until they got my wind. Then they made off as fast as their nimble legs would carry them.

Their scent is very keen. A quarter mile down wind from a hunter, they usually take alarm, lift heads and tails, and go off at a spanking rate; showing that the wind warning was absolutely strong and appreciated.

Concerning their hearing, there are few definite observations. Animals such as the present that do not depend on hearing for their safety, have comparatively small ears. On the other hand, woodland creatures, such as the Moose and Whitetail, have ears on the largest scale—and an excellent measure of their corresponding gift.

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[13]F. B. A., I, p. 242.

Communication

Notwithstanding their poor eyesight, the Caribou seem to do part of their far signalling with apparatus that appeals to the eye. E. A. Preble writes that, soon after leaving his camp, 25 miles south of Cape Eskimo, Hudson Bay, he saw a buck Barren-ground Caribou, on a point of land 200 yards off. "He showed little fear, trotting along the shore abreast of our boat for about a quarter of a mile. He would frequently stop and wade a short distance toward the boat, at short intervals spreading and contracting the white patch on his throat laterally into an oval disc, so abruptly as to give the appearance of flashes of light. He finally got tired of following us and dropped behind."[14]

What was this enterprising buck about? Undoubtedly signalling; and evidently Preble did not respond and get into communication with him, for precisely the same reason that, so far, we have made no adequate response to a number of flashes and ether waves that seem to come from Mars —that is, he didn't know the code.

It is not surprising that the Caribou should use the smell-telephone largely in their transfer of knowledge. All Deer are equipped with a variety of smell glands, whose only known purposes are for inter-communication and identification. In the Caribou, the most important of these glands are deep between the middle toes of each hind foot. How they are used, is best illustrated in a quotation from A. Radclyffe Dugmore's illuminating monograph of the Newfoundland Caribou.[15]

Foot-click. The extraordinary clicking of the feet as the animal walks, is no doubt part of a system of unconscious signals. This sound is made by the feet of all Reindeer and Caribou, and is fully discussed in the Woodland Caribou Life.

Curiosity and Timidity

Of all Deer, the Caribou seem the most inquisitive. Their thirst for knowledge of a new object usually leads them to investigate until they have either smelt it or proven it dangerous. Many times I have humped myself up on an open mound when I knew Caribou were approaching, and have had them come closer and closer; sniffing, snorting, running away, and coming back even closer, usually within ten or twenty yards, but on one occasion so near that I slapped the Caribou on the nose.

Such a weakness reminds one of Antelope on the Plains in the early days; and of the familiar trick of flagging them within shot. It is quite

[14]Mamm. Keewatin, N. A. F., 22, 1902, pp. 41–42.

[15]See Life of the Woodland Caribou, p. 68

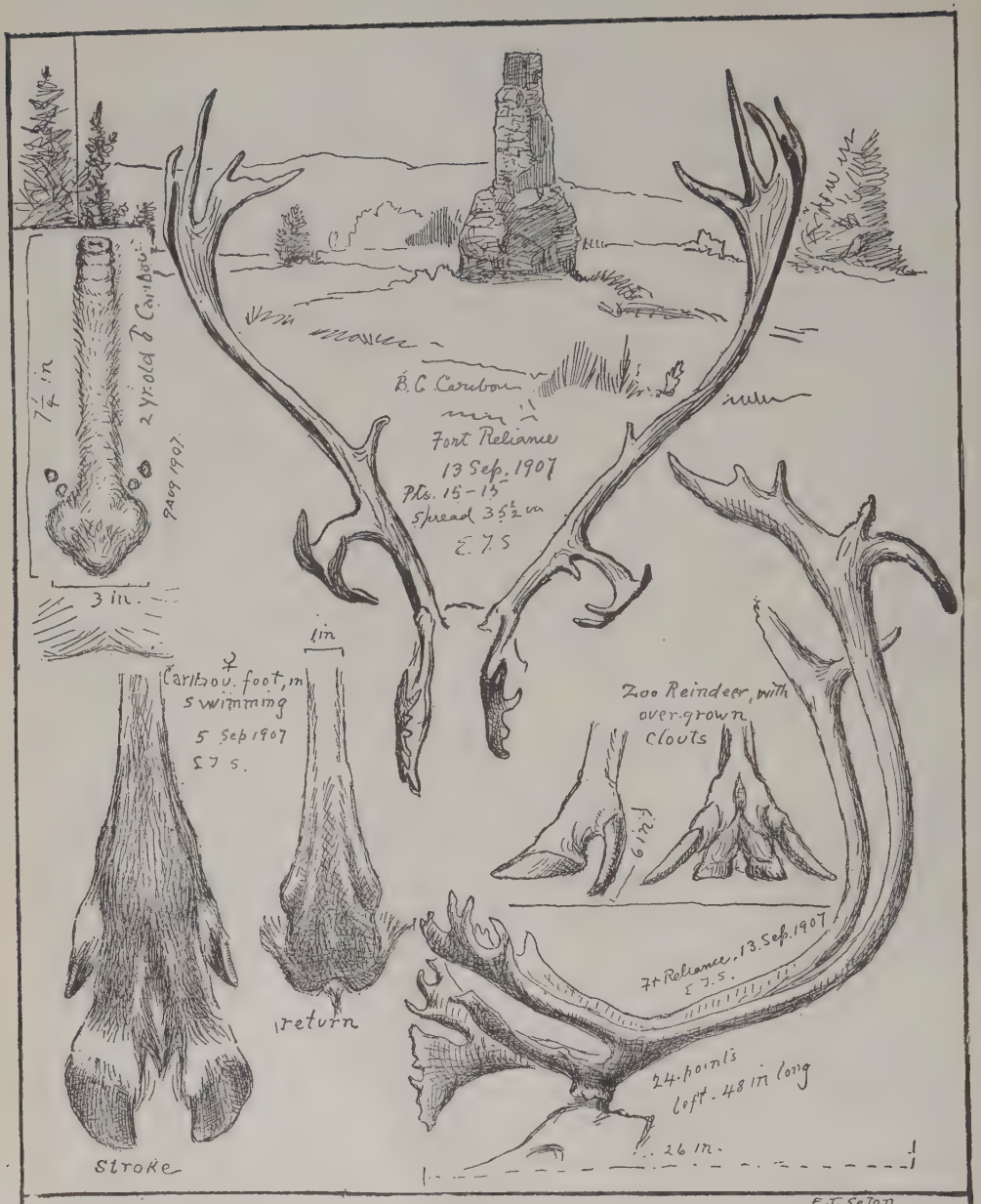


Plate XVII.— Details of Barren-ground Caribou

possible that the Caribou will learn wisdom as the Antelope did; but so far, they are a long way from it.

Usually, however, the decoyed Caribou makes off as soon as he smells the hunter. On another page will be described an Eskimo hunting trick, playing on the inquisitive nature of this quarry.

Like all our Deer, this is essentially a shy and timorous animal. But this I think can be said of it, and it alone—there is no record of a Caribou ever attacking a man, no matter what the provocation.

At Home in the Water

Of all the Deer tribe in America, the Caribou is most at home in the water. He has two great advantages over other Deer: First, the enormous paddle surface of the foot when opened out for the stroke; second, the fact that his coat is composed of hairs, each of which is a little quill full of air. When in full coat, every Caribou is wearing a life-jacket. I think I am right in saying that the Caribou is the only one of our Deer that always floats, if shot in the water.

When travelling, of course, the Caribou turns not a whit for deep lake or river—it is all the same to him. Indeed, there are many places among rocks or timber, where travel is easier for him in the flood than on the land. And at all times, when alarmed or in doubt, the Caribou plunges into the nearest deep water, quite certain that in it he will find a friend who shows comparatively little partiality for any other creature of the region.

With a view to determining his swimming speed, I have often pursued Caribou in a canoe, whose speed rate I knew very well. I found that ordinarily the Caribou in the water goes at the rate of about 2 miles an hour; when hastening he makes 3; if pushed, he can rise to 4; and one occasion, for a short spurt, I saw a band go nearly 6 miles an hour. The water fairly churned around them, and my canoe "had a bone in her teeth," as we 4 husky paddlers sent her at her fastest, which was 7 miles an hour. We were slowly overtaking the band when they reached shore, and galloped off.

Corroboration of these figures is found in Dugmore's "Romance of the Newfoundland Caribou," 1913, p. 36. For this animal, his speed estimates are the same as mine, and were made quite independently. I am convinced that the Caribou is the fastest swimmer of any land animal in America.

Food—in Two Diets

The food of the Caribou is, briefly stated, grass in summer and lichens in winter. At all times, they live on the typical vegetation of the country

they inhabit. In summer, their vast territory is a land of deep waving grass in every one of its million valleys.

The paunches of those I examined had a great mass of ground-up green stuff, evidently grass, but too much reduced to be fully identified. When every hillside is further decorated with low beds of berry-bearing shrubs, it is reasonable to suppose that these characteristic growths are also in the Caribou list of diet; but of that, no proof is at hand.

In the winter, when the fierce blizzards of the North have buried every meadow in several feet of snow, the unkind winds are kind: for their very fierceness lays bare the uplands and the upjutting rocks where grow a dozen lichens and mosses, rich in food value for those who, like the Caribou, have the apparatus and chemical laboratory for its extraction.

These lichens were studied by Richardson and listed as "*Cornicularia tristis*, *divergens*, and *ochrileuca*, the *Cetraria nivalis*, the *cucullata*, and *islandica*, and *Cenomyce rangiferina*."[16]

In the woods of their winter range, he found them feeding "on the *Usniæ*, *Alectoriæ* and other lichens which hang from the trees," and on such swamp grass as is long enough to be available.

About the end of April, when the partial melting of the snow has softened the lichens and mosses which clothe the Barren-grounds like a carpet, the Caribou make short excursions from their winter range in the woods, to feed on the open plains: but return to the shelter of the trees if again the weather turn very cold.[17]

Enemies and Accidents

The Caribou must reckon with Bears, Wolverines, and an occasional Lynx or eagle, as enemies; but all of these are rare on the open range of the North, so that the actual total they take is negligible.

But the great White Wolf of the Arctic region is another story. Every traveller who has spent a season in Caribou-land, has much to say about the Wolf, the relentless parasite of the species.

A great many of the single Caribou that I saw on the Arctic Barrens were on the small islands. In each of 6 cases that came under close observation, the animal in question had a broken leg. A broken leg generally evidences recent inroads by hunters; but the nearest Indians were 200 miles to the south, and the nearest Eskimo 300 miles to the north. There was every reason to believe that we were the only human beings in all

[16]F. B. A., I, p. 243.
[17]As above, p. 243.

that vast region. Certainly we had broken no legs; for every Caribou fired at by us that summer (8) had been secured and used. So that, the more I pondered it, the more it seemed sure that Wolves had broken these Caribous' legs.

How? This is the probable history of each case: The Caribou is so much swifter than are the Wolves, that the latter have no chance in open chase. They, therefore, adopt the stratagem of a sneaking surround, and a drive over the rocks or a precipice, where the Caribou, if not actually killed, is more or less disabled. In some cases, only a leg is broken; and then the Caribou knows his last chance is to reach the water. Here his wonderful powers of swimming assure him of safety; so much so that the Wolves do not attempt to follow. The crippled Deer makes for some island sanctuary, where he rests in peace till his leg is healed; or, it may be in some cases, till the freezing of the lake brings him again into the power of his foe.

These 6, then, were the cripples in hospital; and I hope our respectful behaviour did not inspire them with a dangerously false notion of humanity.

In the far North, when you see a tree, you know perfectly well it is not a tree; it's the horns of a Caribou. One day in Aug., 1907, an unusually large affair of branches appeared on an island in the channel to Aylmer Lake. I landed, camera in hand. The Caribou—for such it proved—was lying down in the open; but there was a tuft of herbage 30 yards from him, and another at 20 yards. I crawled to the first and made a snapshot; then, flat as a rug, sneaked my way to the next. The click of the camera alarmed the buck. He arose, tried the wind; then lay down again, giving me another chance. Having used all the film, I now stood up. The Caribou dashed away, and by a slight limp, showed that he was in sanctuary. The 20-yard estimate proved too long; it was only 16 yards. This put my picture a little out of focus.

Insect Terrors

But the most dreaded enemies of the Caribou are in the insect world. The mosquitoes of the Arctic region are the worst I ever encountered in much travel covering the map from ocean to ocean, and from Florida to the Arctic belt.

I have fully set forth their virulence in "The Arctic Prairies," and for the present, will say only that they hover over every warm-blooded, large animal in clouds. They cover a Horse so that his colour is not visible; a thin-coated Horse would die under their attacks. The Caribou, though protected with coats of thick leather and deep fur, are so harassed by mosquitoes from the middle of June till the middle of August, that they keep

continually running against the wind to find relief; and if a strong wind arise, they will stand on a high ridge, for the full enjoyment of its blessed immunity.

This constant travelling against the wind, has much to do with the summer distribution of the Caribou. A steady, gentle northern breeze for 3 days at Artillery Lake, sent every Caribou out of the country at a fast trot. All went north; nor did they reappear until after a long-continued change of wind.

Another enemy is the deer-fly bot, warble or *oestrus*. It attacks the Caribou in such numbers, that it spoils the skin for leather, in some regions —at least, such is the report.

A fine young buck killed by my party Sept. 5, 1907, had 121 bot scars in his back and rump, chiefly the latter. But I could not see that they affected the skin or hair in the least.

A friend of mine who had the ill luck to incubate a bot-warble in his leg, says that he did not know anything about it till it was well grown. Then, at times, apparently when it was turning around, the pain and itching were maddening. If they affect the Caribou in the same way, this young buck with 121 bots has our deepest sympathy; especially if the grubs had a fancy, at times, for changing their positions all at once.

Samuel Hearne's remarks on these parasites are so full of local colour, and withal so appetizing, that I quote:

"When the rutting season is over, and the Winter sets in, the deer-skins are not only very thin, but in general full of worms and warbles; which render them of little use, unless it be to cut into fine thongs, of which they make fishing nets, and nets for the heels and toes of their snow shoes. Indeed, the chief use that is made of them in Winter is for the purpose of food; and really when the hair is properly taken off, and all the warbles are squeezed out, if they are well boiled, they are far from being disagreeable. The Indians, however, never could persuade me to eat the warbles, of which some of them are remarkably fond, particularly the children. They are always eaten raw and alive, out of the skin; and are said, by those who like them, to be as fine as gooseberries. But the very idea of eating such things, exclusive of their appearance (many of them being as large as the first joint of the little finger), was quite sufficient to give me an unalterable disgust to such a repast; and when I acknowledge that the warbles out of the Deer's backs, and the domestic lice, were the only two things I ever saw my companions eat, of which I could not, or did not, partake, I trust I shall not be reckoned over-delicate in my appetite."[18]

[18] Journey, p. 197.

There is another grub, probably the larva of a fly, that is said to infest the nostrils of the Caribou. I never saw it, but have seen Caribou stamping and snorting, with the head very low, as though they were suffering from something inside, that acted much like the pestiferous bot that inhabited the leg of my friend.

Sir John Franklin, in his first "Journey to the Polar Sea,"[19] makes some interesting remarks about the bots and their hosts. There is so much natural history observation implied that I suspect the passage to be really from the pen of Dr. John Richardson who accompanied him on that memorable journey. The Woodland Caribou, he says, "never leaves the woods, but its skin is as much perforated by the gadfly as that of the others; a presumptive proof that the smaller species are not driven to the sea coast by the attacks of that insect. There are a few Reindeer occasionally killed in the springw, hose skins are entire; and these are always fat, whereas the others are lean at that season. The gadfly does not confine its attacks to the skin of the back, but deposits its *ova* in the mucous membrane also, which lines the nostrils and fauces. This insect likewise infests the Red-deer (*wawaskeesh*) [Wapiti], but its ova are not found in the skin of the Moose, or Buffalo, nor, as we have been informed, of the Sheep and Goat that inhabit the Rocky Mountains, although the Reindeer found in those parts (which, by the way, are of an unusually large kind), are as much tormented by them as are the Barren-ground variety."

Medication

The following remark by D. T. Hanbury reflects the innate hankering of all grass-eaters for a saline tonic:

Caribou, he says, "are very fond of licking the snow on which Dogs have deposited their urine, probably on account of the salt it contains; and of this queer taste the Huskies take advantage in laying down a bait, so that large numbers of Deer are captured [in pitfalls]."[20]

As Food in Famine-land

Any one who has seen the wasteful ways of butchering a steer on the Western ranges in early days, recognizes the opposite extreme in the stockyards to-day. On the range, they wasted the hide, the in'ards, the head, and everything, in fact, but the very best of the meat. In the stockyards,

[19]1823, p. 242.

[20]Northland, pp. 114–15.

PLATE XVIII.—SKETCHES OF NORWAY REINDEER

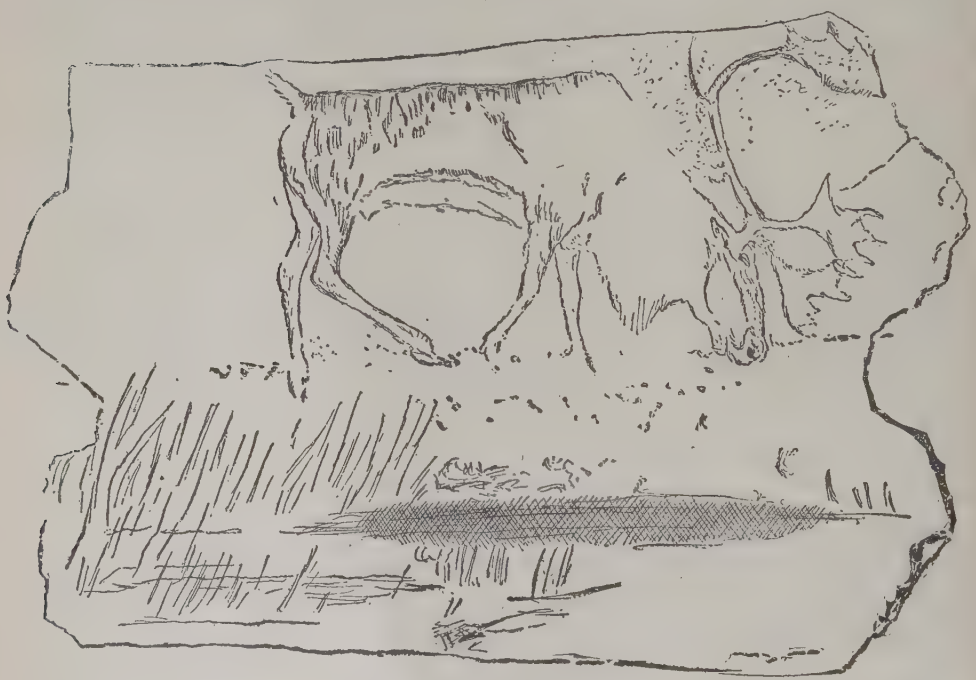


PLATE XIX.—PREHISTORIC DRAWING OF REINDEER FROM KESSERLOCH CAVE, SWITZERLAND

(From Prof. Albert Hein's reproduction in Lartet and Christy's Reliquiae Aquitanicæ)
(Size of original).

they utilize every ounce of meat as well as head, horn, hide, hoofs, blood, bones and marrow—"everything but the squeal."

These two methods are exactly paralleled among the hunters in the North. The white man kills his Caribou, cuts out roughly and wastefully the haunches, and leaves the rest for the ravens. The northern Indian or Eskimo wastes nothing but "the squeal." Every ounce of the creature, even to its intestines, the stomach contents, and the maggots in the skin are turned to account.

Here is Sir John Richardson's account, after he had summered and wintered among the Caribou and the caribou-eaters:

"The flesh of the Caribou is very tender, and its flavour when in season is, in my opinion, superior to that of the finest English venison; but when the animal is lean, it is very insipid, the difference being greater between well-fed and lean Caribou than any one can conceive who has not had an opportunity of judging. The lean meat fills the stomach, but never satisfies the appetite, and scarcely serves to recruit the strength when exhausted by labour. The flesh of the Moose-deer and Buffalo, on the other hand, is tough when lean, but is never so utterly tasteless and devoid of nourishment as that of a Caribou in poor condition.

"The Chepewyans, the Copper Indians, the Dog-ribs and Hare Indians of Great Bear Lake, would be totally unable to inhabit their barren lands were it not for the immense herds of this Deer that exist there."[21]

The Back-fat

There is a peculiarity of most horned game in the North, that requires full consideration.

Most of us in nursery days learned of the Camel storing up in his hump, food which, when other rations failed, could keep him going for many days; until, indeed, the hump was absorbed, and the Camel dehumped again.

It is not generally recognized that most of our Northern horned game have a storage hump. In some, as in the Buffalo, it is Camel style; in others, it is spread out into a great broad band of marrow-like fat, that covers the back and the rump. This accumulated foodstuff is not only stored-up heat and energy; it is an amazingly good non-conductor of heat, and serves the fat and happy animal as an extra blanket worth more than double as much fur. This most un-irksome load of condensed emergency rations, is known to the English hunters as the "back-fat," to the French as the "*dépouille*," that is, "spoil" of the chase—the chief prize.

Of this Richardson says: "When in condition, there is a layer of fat

[21] F. B. A., I, p. 244.

deposited on the back and rump of the males to the depth of two or three inches or more, immediately under the skin, whch is termed *dépouille* by the Canadian voyagers; and as an article of Indian trade, it is often of more value than all the remainder of the carcass. The *dépouille* is thickest at the commencement of the rutting season; it then becomes of a red colour, and acquires a high flavour, and soon afterwards disappears. The females at that period are lean; but in the course of the winter they acquire a small *dépouille*, which is exhausted soon after they drop their young."[22]

Dr. R. M. Anderson, of Ottawa, says: "The largest slab of back-fat I have seen taken from a Caribou on the Arctic coast, was from a bull killed near Langton Bay early in September, the fat weighing 39 pounds. A large bull killed by Mr. Stefansson on Dease River in October, had back-fat 72 mm. in thickness ($2\frac{7}{8}$ inches). .. Comparing the thickness of this with the Langton Bay specimen, the back-fat of the Dease River bull must have weighed at least 50 pounds. The thicker the back-fat of a Caribou is, the richer it is in proportion—the amount of connective tissue remaining the same, and the additional weight consisting of interstitial fat."[23]

Pemmican

The marrow, says Richardson, "is used in making the better kinds of the mixture of dried meat and fat, which is named *pemmican*, and is also preserved by the young men and females for anointing the hair, and greasing the face on dress occasions."[24]

"When it is necessary," he continues, "to preserve the Caribou meat for use at a future period, it is cut into thin slices and dried over the smoke of a slow fire, and then pounded betwixt two stones. This pounded meat is very dry and husky if eaten alone; but when a quantity of the back fat or *dépouille* of the Deer is added to it, is one of the greatest treats that can be offered to a resident in the Fur Countries. Pemmican is formed by pouring one third part of melted fat over the pounded meat and incorporating them well together. If kept dry itm ay be preserved sound for three or four years, and from the quantity of nourishment it contains in small bulk, it is perhaps the best kind of food for those who travel through desert lands. *Thueehawgan* is a mixture of pounded Deer's meat and dried fish or fish-roe, which is eaten raw, or when made into soup by throwing a handful of it into boiling water."[25]

[22]F. B. A., I, pp. 243–44.
[23]My Life with the Eskimo, Stefansson, 1922 ed., pp. 505–06.
[24]F. B. A., I, p. 245.
[25]As above.

Odds and Ends

Every part of the creature is saved by the natives and turned to good account.

"The tongue roasted," says Richardson, "when fresh or when half dried, is a delicious morsel.[26]

"The blood, if mixed in proper proportion with a strong decoction of fat meat, forms, after some nicety in the cooking, a rich soup, which is very palatable and highly nutritious, but very difficult of digestion. When all the soft parts of the animal are consumed, the bones are pounded small. and a large quantity of marrow is extracted from them by boiling.[27]

"The shin-bone of the Deer, split so as to present a sharp edge, is the knife that is used to remove the hair in the process of making the leather."[28]

"Of the Caribou horns they form their fish-spears and hooks; and, previous to the introduction of European iron, ice-chisels and various other utensils were likewise made of them."[29]

"The tendons of the dorsal muscles are split into fine and excellent sewing thread."[30]

"The hunter breaks the leg bones of a recently slaughtered Deer, and while the marrow is still warm, devours it with much relish. The kidneys and part of the intestines. particularly the thin folds of the third stomach or many-plies are likewise occasionally eaten when raw; and the summits of the antlers, as long as they are soft, are also delicacies in a raw state. The colon or large gut is inverted, so as to preserve its fatty appendages, and is, when either roasted or boiled, one of the richest and most savoury morsels the country affords, either to the native or white resident. The remainder of the intestines, after being cleaned, are hung in the smoke for a few days and then broiled."[31]

Nerrooks or Eskimo Salad

It is well known that the Caribou moss, indigestible to the human stomach, becomes good food for man after it has been chewed, swallowed, and partly digested by the Caribou.

Of this Richardson says: "The stomach and its contents, termed by the Esquimaux *nerrooks*, and by the Greenlanders *nerrokak* or *nerriookak*, are

[26]F. B. A., I, p. 245.
[27]As above.
[28]As above, p. 244.
[29]As above.
[30]As above.
[31]As above.

also eaten; and it would appear that the lichens and other vegetable matters on which the Caribou feeds are more easily digested by the human stomach when they have been mixed with the salivary and gastric juices of a ruminating animal. Many of the Indians and Canadian voyagers prefer this savoury mixture after it has undergone a degree of fermentation or lain to season, as they term it, for a few days."[32]

Evidently the Caribou juices are of far higher digestive power than are those of man. Would it not be possible for Northern explorers to carry a small quantity of hydrochloric acid, pepsin, or other chemicals that are needed to simulate Caribou juices? By previous treatment with these one might make this vast food supply possible for man, without the Caribou's help, in case the need should come, to live on the Caribou forage that everywhere carpets the Arctic plains. Such a device, had it been available, in the last century, would have saved the lives of many Arctic explorers and hundreds of natives.

The Pelt and the Hide

Richardson continues thus, in setting forth the almost unparalleled serviceability of this flock-beast of the North:

"The closeness of the hair of the Caribou, and the lightness of its skin, when properly dressed, render it the most appropriate article for winter clothing in the high latitudes. The skins of the young Deer make the best dresses, and they should be killed for that purpose in the months of August or September; as, after the latter date, the hair becomes too long and brittle. The prime parts of eight or ten deer-skins make a complete suit of clothing for a grown person; which is so impervious to the cold, that, with the addition of a blanket of the same material, any one . . . may bivouack on the snow with safety, and even with comfort, in the most intense cold of an arctic winter's night."[33]

When Indian-tanned, the skin "forms a soft and pliable leather, adapted for mocassins and summer clothing; or when sixty or seventy skins are sewed together, they make a tent sufficient for the residence of a large family. . . .

"The undressed hide, after the hair is taken off, is cut into thongs of various thickness, which are twisted into deersnares, bow-string, net-lines, and in fact supply all the purposes of rope. The finer thongs are used in the manufacture of fishing nets, or in working snowshoes."[34]

[32] F. B. A., I, p. 245.
[33] As above, p. 242.
[34] As above, p. 244.

Domestication

One often hears the question whether this animal with such a rare list of benevolent attributes could not be domesticated to complete its round of services; and so become, in northern Canada, what its cousin the Old World Reindeer is in Lapland. The answer is—Of course it could, but why wait for many slow generations to domesticate this, when it is so much easier and more satisfactory to introduce the ready-trained creature from Lapland? That is what is being done in several parts of America. In Alaska, the Lapland Reindeer is thoroughly established. The subject is more fully treated in the Life of the Woodland Caribou.

Outwitting the Caribou

Because the Caribou is the least shy of all Deer, it rather lends itself to slaughter, once its chief protection—the remoteness of its haunts—is overcome. Thousands have been speared from canoes, while crossing some great river or long lake; whole herds have been dropped by a withering rifle-fire on their winter range; hundreds are annually taken in pen-traps, pitfalls, and runway nooses. The details of such methods are not profitable reading, except so far as they illustrate the mental powers of game and of hunter.

If they were likely to teach new modes of destruction, I should leave them out; but there is little danger of that. The only menace to-day is lawless slaughter with repeating firearms. But open hunting—that is, a fair match of wits—is in another category, especially when circumstances or the law impose a bag limit. As illustration, I offer a number of hunting pictures among the Northern natives, armed with native wit and native weapons.

Capt. Geo. F. Lyon sojourned among the Eskimo, 1821–23, before the advent of villainous saltpetre to ruin their woodcraft, and to extirpate their game. He writes thus of a Caribou hunt:

"When two men hunt in company, they sometimes purposely show themselves to the Deer, and when his attention is fully engaged, walk slowly away from him, one before the other. The Deer follows, and when the hunters arrive near a stone, the foremost drops behind it and prepares his bow, while his companion continues walking steadily forward. This latter, the Deer still follows unsuspectingly, and thus passes near the concealed man, who takes deliberate aim and kills the animal."[35]

[35] Priv. Journ., p. 244.

The above trick, by the way, I have seen played very exactly by a pair of Coyotes to victimize a Prairie-dog that was fat enough to be worth having, and fool enough to be caught.

Ambush and Decoy

When the Caribou are feeding on the level open ground, says Lyon, "an Esquimaux makes no attempt to approach him; but should a few rocks be near, the wary hunter feels secure of his prey. Behind one of these he cautiously creeps, and having laid himself very close, with his bow and arrow before him, imitates the bellow of the Deer when calling to each other. Sometimes, for more complete deception, the hunter wears his deer-skin coat and hood so drawn over his head, as to resemble, in a great measure, the unsuspecting animals he is enticing. Though the bellow proves a considerable attraction, yet if a man has great patience, he may do without it, and may be equally certain that his prey will ultimately come to examine him; the Rein-deer being an inquisitive animal, and at the same time so silly, that if he sees any suspicious object, which is not actually chasing him, he will gradually, and, after many caperings and forming repeated circles, approach nearer and nearer to it. The Esquimaux rarely shoot until the creature is within twelve paces; and I have frequently been told of their being killed at a much shorter distance. It is to be observed, that the hunters never appear openly, but employ stratagem for their purpose; thus, by patience and ingenuity, rendering their rudely-formed bows, and still worse arrows, as effective as the rifles of Europeans."[36]

Sir John Franklin, after noting the unshyness of the Caribou, or rather the ease with which they may be approached, adds: "Indeed, their curiosity often causes them to come close up to and wheel round the hunter, thus affording him a good opportunity of singling out the fattest of the herd; and upon these occasions they often become so confused by the shouts and gestures of their enemy, that they run backwards and forwards with great rapidity, but without the power of making their escape.

"The Copper Indians find by experience that a white dress attracts them most readily, and they often succeed in bringing them within shot, by kneeling and vibrating the gun from side to side, in imitation of the motion of a Deer's horns when he is in the act of rubbing his head against a stone.

"The Dog-rib Indians have a mode of killing these animals, which, though simple, is very successful. It was thus described by Mr. Wentzel, who resided long amongst that people. The hunters go in pairs, the foremost man carrying in one hand the horns and part of the skin of the head

[36] Priv. Journ., pp. 243–44.

of a Deer, and in the other a small bundle of twigs, against which he, from time to time, rubs the horns, imitating the gestures peculiar to the animal. His comrade follows treading exactly in his foot-steps, and holding the guns of both in a horizontal position, so that the muzzles project under the arms of him who carries the head. Both hunters have a fillet of white skin round their foreheads, and the foremost has a strip of the same round his wrists. They approach the herd by degrees, raising their legs very slowly but setting them down somewhat suddenly, after the manner of a Deer, and always taking care to lift their right or left feet simultaneously. If any of the herd leave off feeding to gaze upon this extraordinary phenomenon, it instantly stops and the head begins to play its part by licking its shoulders and performing other necessary movements. In this way the hunters attain the very centre of the herd without exciting suspicion, and have leisure to single out the fattest. The hindmost man then pushes forward his comrade's gun, the head is dropt, and they both fire nearly at the same instant. The herd scampers off, the hunters trot after them; in a short time the poor animals halt to ascertain the cause of their terror, their foes stop at the same moment, and having loaded as they ran, greet the gazers with a second fatal discharge. The consternation of the Deer increases, they run to and fro in the utmost confusion, and sometimes a great part of the herd is destroyed within the space of a few hundred yards."[37]

Slaughter in the Water

The Eskimo method is thus described by Lyon: "When the Deer assemble in herds, there are particular passes which they invariably take; and on being driven to them, are killed with arrows by the men; while the women, with shouts, drive them to the water. Here they swim with the ease and activity of water-dogs, the people in kayaks chasing and easily spearing them: the carcasses float, and the hunter then presses forward and kills as many as he finds in his track. No springes, or traps, are used in the capture of these animals, as is practised to the southward, in consequence of the total absence of standing wood."[38]

Pitfalls

"The Esquimaux who inhabit the coast of the Welcome, to the southward of Chesterfield Inlet, have an opportunity, by the animals continuing in their country [during winter], of shewing their ingenuity in the construc-

[37]Narrative Journey to Polar Sea, 1823, pp. 243–44.

[38]Priv. Journ., p. 244.

tion of deer-traps, of their convenient and elegant building material, compact snow. The sides of the trap are built of slabs of that substance, cut as if for a snow-house; an inclined plane of snow leads to the entrance of the pit, which is about five feet deep, and of sufficient dimensions to contain two or three large Deer. The pit is covered with a large, thin slab of snow, which the animal is enticed to tread upon by a quantity of the lichens on which it feeds being placed conspicuously on an eminence beyond the opening. The exterior of the trap is banked up with snow so as to resemble a natural hillock, and care is taken to render it so steep on all sides but one, that the Deer must pass over the mouth of the trap before it can reach the bait. The slab is sufficiently strong to bear the weight of a Deer until it has passed its middle, when it revolves on two short axles of wood, precipitates the Deer into the trap, and returns to its place again in consequence of the lower end being heavier than the other."[39]

The Drive

Old timers of our Buffalo days will recall the two long lines of sod piles that formed the funnels to guide the Buffalo into the pound. A somewhat similar device is in use among the Eskimo for driving and stalking the Caribou.

"Throughout the whole line of coast frequented by the Esquimaux," says Richardson, "it is customary to see long lines of stones set on an end, or of turfs piled up at intervals of about twenty yards, for the purpose of leading the Caribou to stations where they can be more easily approached. The natives find by experience that the animals, in feeding, imperceptibly take the line of direction of the objects thus placed before them, and the hunter can approach a herd that he sees from a distance, by gradually crawling from stone to stone, and remaining motionless when he sees any of the animals looking towards him. The whole of the Barren-Grounds are intersected by Caribou paths like sheep-tracks, which are of service to travellers at times in leading them to convenient crossing places of lakes or rivers."[40]

The Deer Pound

On Pike's Portage in 1907, I saw an old Deer pound used by the Chipewyans during the great migration of "*La Foule.*" Hearne describes one of these fully thus:

[39] F. B. A., I, pp. 246–47.

[40] As above, p. 247.

"When the Indians design to impound Deer, they look out for one of the paths in which a number of them have trod, and which is observed to be still frequented by them. When these paths cross a lake, a wide river, or a barren plain, they are found to be much the best for the purpose; and if the path run through a cluster of woods, capable of affording materials for building the pound, it adds considerably to the commodiousness of the situation. The pound is built by making a strong fence with brushy trees, without observing any degree of regularity, and the work is continued to any extent, according to the pleasure of the builders. I have seen some that were not less than a mile round, and am informed that there are others still more extensive. The door or entrance or the pound is not larger than a common gate, and the inside is so crowded with small counter-hedges as very much to resemble a maze, in every opening of which they set a snare, made with thongs of parchment deer-skins well twisted together, which are amazingly strong. One end of the snare is usually made fast to a growing pole; but if no one of a sufficient size can be found near the place where the snare is set, a loose pole is substituted in its room, which is always of such size and length that a Deer cannot drag it far before it gets entangled among the other woods, which are all left standing, except what is found necessary for making the fence, hedges, &c.

"The pound being thus prepared, a row of small brush-wood is stuck up in the snow on each side of the door or entrance, and these hedge rows are continued along the open part of the lake, river, or plain, where neither stick nor stump besides is to be seen, which makes them the more distinctly observed. These poles or brush-wood are generally placed at the distance of 15 or 20 yards from each other, and ranged in such a manner as to form two sides of a long acute angle, growing gradually wider in proportion to the distance they extend from the pound, which sometimes is not less than two or three miles, while the Deer's path is exactly along the middle, between the two rows of brush-wood.

"Indians employed on this service always pitch their tents on or near to an entrance that affords a commanding prospect of the path leading to the pound; and when they see any Deer going that way, men, women, and children walk along the lake or river side under cover of the woods, till they get behind them, then step forth to open view, and proceed towards the pound in form of a crescent. The poor timorous Deer finding themselves pursued, and at the same time taking the two rows of brushy poles to be two ranks of people stationed to prevent their passing on either side, run straight forward in the path till they get into the pound. The Indians then close in, and block up the entrance with some brush trees that have been cut down

and lie at hand for that purpose. The Deer being thus enclosed, the women and children walk round the pound to prevent them from jumping over or breaking through the fence; while the men are employed spearing such as are entangled in the snares, and shooting with bows and arrows those which remain loose in the pound.

"This method of hunting, if it deserves the name, is sometimes so successful, that many families subsist by it without having occasion to move their tents above once or twice during the course of a whole winter."[41]

His Way of Life

It was on the great beautiful plains between Artillery Lake, and Back's River, that I came to know this big, kind creature. Here, in the summer and autumn of 1907, I lived in his daily life, and made the notes that now are offered in orderly array.

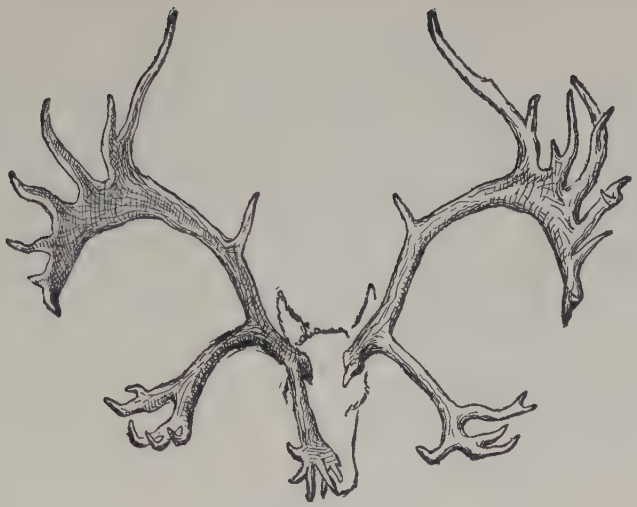
Reference to the map, shows that all of the large Arctic islands are within the range of the Caribou. If to this, you add the broad belt of land that lies just south of the Arctic Sea, you have the summer home of the Caribou species. All of it is in the Arctic region; and if that word conjures up in your mind, a realm of snow, ice, and bleak winds, you must entirely rearrange your picture. In the summer, it is a land of rich, rolling pastures, verdant meadows, lavished over with blossoms of a myriad delicate and gorgeous hues. So far as snow is concerned, you will not find it; and as for ice, it is unknown inland, except perhaps on the waters of some blue lake, where drifting remnants of the winter bond, are slowly disappearing under the glare of the blazing summer Arctic sun. Millions of sweet-singing birds or loud-calling divers, ducks and shorebirds, are there to give the wildest little thrills of joy to a scene unspoiled by man—yes, ignorant of his existence.

This is the summer home towards which the wise old mother Caribou was headed, when she left the spindly woods of the "Land of Little Sticks," 500 miles away, with its plague of hunters—brutish and mannish.

In summer, at least, a Caribou seems always in a hurry. This is due probably to the need for dodging the mosquitoes, which are worse in its far northern home than anywhere else on earth; and unless there is a high wind, the Caribou must trot against the breeze, to secure a little respite from their singing tormentors.

At all seasons, they are to be found in bands, unless indeed during the second month of June when the mothers, at least, are alone.

[41] Journey, pp. 78–80.



Tanana Caribou
Spread, 47½ inches; length of right beam, 53 inches; points 20 and 18
In the collection of W. F. Sheard

Fifty-seven-point Caribou from Kenai Peninsula
In the collection of Harry E. Lee
From a photograph by La Roche, Seattle

PLATE XX.—RECORD ANTLERS

Mating and Young

The rut of the Barren-ground Caribou takes place in late October, and is much like that of other Deer. There are the same combats, insane jealousies, hatreds, finish-fights, harems, exhaustions, and violent reactions; after which the herds are once more socially cleft into male and female for a time. But hunger and common danger reunite them, so that they pass the winter together, in the land of puny timber. Deep snow and blizzard wind aplenty, they must fight and face, before the spring—the glorious spring of the Northland—comes to set their armies a-trekking toward the sea.

Far out on the lonesome, open plains—yea, even on the Arctic shore—the mother Caribou hies her in the month of June to face all alone her trial time.

Here, in a hundred thousand little fairy dells, among sweet flowers and softest moss, a hundred thousand mother Caribou produce their hundred thousand bright-eyed fawns in soft, brown coats with dull white blots, like little boulders patched with polka dots of decorating moss.

There is a lack of exact observation on the first two or three days of the little one's life. But the scanty evidence seems to show that the young one is strong enough to follow when but an hour or two old; and is never left hidden by the mother, as with certain other Deer. Few and far between are their foemen here. The Arctic Wolf, the Barren-ground Bear, and the Wolverine are rare; the White Bear sticks to his sea coast, his Seals and his fish, and seldom wanders inland among the Polar Gardens.

Though not hidden and left wholly to themselves, the young ones spend much time lying still as death, while mother grazes in the offing, coming at proper intervals to feed them, according to their need. Thus, for a time, they hide and play brown boulder in the moss; but they are born to legs of speed, and already in July they seem well grown, and able to hold their own in the daily foot-race that is the normal life of a Northern Caribou.

Through July and August, they thrive apace despite the myriads of blood-sucking mosquitoes that are their chiefest foes.

By August, they are one third grown, and accepted members of their tribe. For 2 months they have been suckled; and now in mid-August usually they are weaned. Gradually they have adopted their national bill of fare—grass in summer, and lichens in winter.

But the mosquito and bot-plagues are over and done by this time. The biggest sorrow of the Caribou's summer life is gone; and now the great North Plains and Polar Islands are seen at their best; are, indeed, among the loveliest spots on all the surface of the globe. Rich pastures are spread as

far as the eye can see, and are lavishly spangled with flowers even yet; fruits of a score of kinds are on every bank; grass and moss in abundance everywhere. This surely is a Caribou paradise—yes, a human paradise. All the world rejoices.

September with its shortening days and tang bright airs, is even better. The Caribou are full of life and vigour. Now the young and their mothers may laugh and grow fat; for all of their broad, fair world is littered over with choice foods of a hundred kinds; their few enemies are of little power; and they are grown to full-statured Caribou-hood, before the first sharp frost in late September has rimmed the little pools with its crystal spears.

There may have been flurries of snow late in August or early September; but at that time it never lies. The passing storm may send the snow-bird and the longspur on their southward trip; but to the Caribou, it is a pleasant nothing.

Autumn Bands

In October, the islands of the Polar Sea begin to have still sharper frost and snow that does not die at noon. Then the wise old mother Caribou, with her well-grown child, accepts the warning; and points her nose more truly south than needle could at this place. She travels Caribou-like, daily, quickly, pertinaciously—20 miles, 40 miles, some days 60 miles; and leads her calf, as her own mother once led her, ever and daily a little nearer to the dwindling forest belt, the winter home of her race.

The calves are sleek and half-grown; their mothers, recovered and fat. Their fathers, in new clean antlers, swelling necks and flowing white manes, are filled with lusty vigour. They begin to show just a little interest in the other sex. With late October, comes the climax of their lives, and the climax of their roving. The mating season is on; and the first snowstorm will surely set them roaming southward in their annual trek.

One of the biggest and most picturesque facts in the life of the Caribou is this migration; going northward in spring, but southward again in autumn.

Those bands that dwell in the big islands of the Polar Sea, move southward into the lowest and most sheltered parts of their home; but they do not leave the islands, except, perhaps, in the case of islands very close to the north shore of the mainland.

The evergrowing herd—bucks, does, and fawns—now moves southward, steadily southward. The insect urge is gone, but the snow is falling, and there is promise of better things in the South. Yet it seems that all do not go; there is sure to be a sprinkling of Caribou in all parts of the range at all

times of the year, even on their Southwest winter range in summer, according to J. B. Tyrrell.[42]

But the great growing herd moves on each day. New bands come, and its booming ranks spread wider, move faster; for now their numbers make a local food scarcity. They must travel quickly to feed. The hundreds of the early gatherings become thousands; the thousands become hundreds of thousands. And still they grow, and surge along, till this southward march is perhaps the greatest zoological spectacle remaining on earth to-day—the last of the kind as yet unspoiled by ever-devastating man.

Erratic Migration

While this presentation of the migration habit and plan seems very simple and satisfactory, it is not by any means so complete as might appear. All white men who have observed it, agree on its irregularity and uncertainty. The Indians themselves, I found completely at fault, nearly always, in predicting the movement.

During the summer of 1907 which I spent in the country around Artillery Lake, the largest band of Caribou that I saw was 400. This was on August 3d; but they were going north.

On the other hand, Hanbury writes, July 31, 1901: "At the head of Aberdeen Lake [Lat. 101° on Arkilinik River], we found Deer in large bands on their annual migration to the South."[43]

Similarly, H. T. Munn, of Brandon, told me that when he camped at Artillery Lake, July 25, 1892, the advance guard of the great southward travelling herd of Caribou appeared on the north shore. His party had seen none until then. On the 27th, the great herd ("La Foule") came. He and his outfit now turned southward. For three weeks, they saw thousands of Caribou every day. The cows preponderated in these herds; but, according to their guides, the bulls would come at the end. He thought the stream was not more than a few miles wide—certainly less than ten. The animals were travelling about 4 miles an hour, and kept it up; swimming a lake in preference to going around it.

In Frank Russell's "Explorations" is a note which I think illustrates the changeability of the Caribou's route rather than the diminution of their numbers. He says, "A few years ago, the Barren Ground Caribou appeared about the Fort [Rae] regularly upon All Saints' Day. They were often killed from the buildings; and throughout the winter might be found near the post. In 1877, an unbroken line of Caribou crossed the frozen lake near

[42]Rep. Can. Geol. Surv., Vol. 8, p. 13D, 1896.

[43]Northland, p. 10.

the fort; they were 14 days in passing, and in such a mass that, in the words of an eyewitness, 'daylight could not be seen' through the column. They are now [1894] seldom seen within several miles of Rae."[44]

To this he adds later:

"They seem to have moved eastward, as they have entirely deserted the timbered country along the Mackenzie River. They are not abundant in winter around Rae, where they were killed by hundreds ten years ago. Only one small band crossed the lake towards the west during the winter of 1893–4. Thousands remain in the Barren Ground with the Musk-ox, never reaching the timber at all; . . . the greater part of those which enter the timber are massed together into a single herd, which is so erratic in its movements that the Indians, who depend entirely upon the Caribou for food, are often reduced to the verge of starvation. They move against the wind so that the direction—whether towards Rae or Fond du Lac—depends upon the prevailing winds during the last fortnight in October. . . . It is said that only the females reach the sea-coast . . . but I have seen both sexes wading in the shoal water of the Arctic Ocean, south of Herschel Island, in July.

"West of the Mackenzie, they are still abundant along the barren coast and in the mountains south of it. They migrate southward in autumn, but how far is not known. Rampart House was a "Deer post," being situated in a pass traversed semi-annually by the Caribou."[45]

The Winter Range

The Caribou summer in the Arctic region, and winter in the Hudsonian belt. This, despite some exceptions, is true as a general statement. A glance at the map shows that the largest area of the summer range is the great triangle bordered on the east by Hudson Bay, on the north by the Arctic Ocean, and on the southwest by the timberline, that is the north edge of the Hudsonian belt. Being their largest area, and the region least touched by man, it has by far the most Caribou; and it is in the autumn migration from this, that their armies, myriad-strong, are to be seen, as detailed later. Finally and logically, it is in the range just south of this, that the vast herds are to be seen in winter.

Apparently these Deer are numerous during winter in all the country east of Great Bear Lake; but their particular abundance is in that highly favoured tract between Great Slave Lake and Hudson Bay.

In the summer of 1892, J. B. Tyrrell, the explorer, entered this region

[44]Far North, p. 88.

[45]As above, pp 226–27.

from the South by going up Caribou River, a superb tributary of the Churchill, which it joins 225 miles north of Battleford. From Tyrrell's account[46] I select the following:

"As the river is ascended, poplar, white spruce, and all underbrush gradually disappear, and the country becomes generally wooded with banksian pine, with black spruce in wet places, and great stony tracts devoid of timber of any kind. We have now reached the winter home of the Caribou, which, in this region, stretches northward from about lat. 56° 45′. It consists of long, almost bare, hills of archean rocks, separated by wide valleys, the bottoms of which are filled with sand and ridges of boulders. In these valleys, lie many small lakes.

. . . . . .

"The Indians report that the Deer collect on the frozen surface of these lakes during the day in immense herds; and are readily killed as long as the desire remains to shoot them, or till the whole herd is exterminated. My informants stated that last winter, the hunters killed from 100 to 300 apiece. Besides Deer, a fairly successful hunt of fur-bearing animals was also made. . . .

"Fond du Lac itself is situated at a narrow part of the lake on one of the main paths used by the Caribou going southward; and Mercredi [of Fort Chipewyan] informed me that for a week or more in autumn, the Deer can be killed in great numbers from the door of the Post, as they pass through the yard and among the houses. Several of the men were said to have killed as many as 400 during the past year."

Without any movement on a large scale, the herds continue in the land of stunted timber from October till March or April. While there is no migration of the whole body during this long, hard, winter spell, there are many local movements of small herds, dictated first and chiefly by the search for food; but probably, also, by the need for avoiding great hunting parties of Indians or traders. Both of these count on this place for a supply of meat to carry their people all winter, and well over the coming summer too.

There are not sufficient data at hand to detail the movements of the Alaska Caribou. But there can be little doubt that the migration exactly parallels that observed in the Great Slave Lake country.

In Labrador, similar conditions have established similar habits; but the present comparative scarcity of the animals makes it less important, less of a spectacle, and far less known.

[46]Western World, Winnipeg, Dec., 1892.

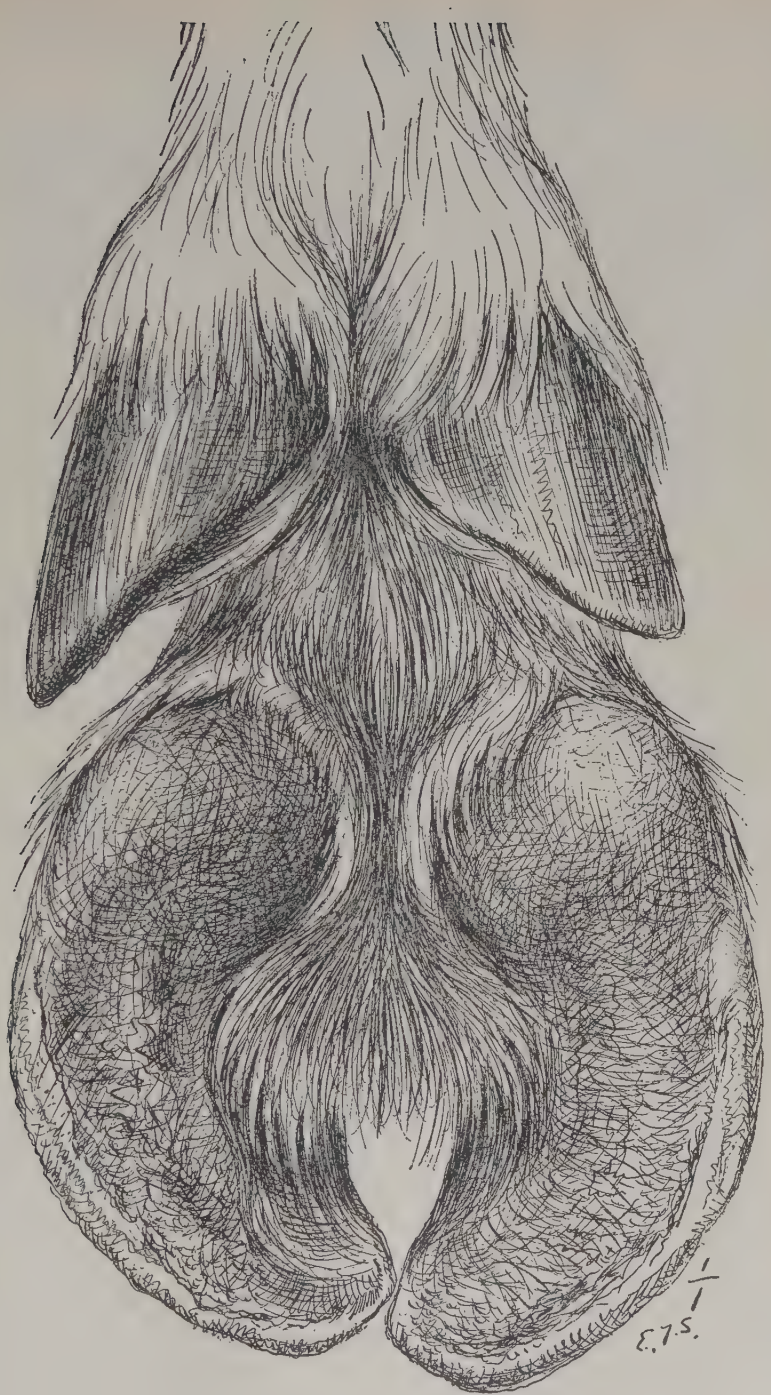


Plate XXI. - Barren-ground Caribou foot. 1907

The Familiar Story of Slaughter

A glimpse of the primitive abundance of Caribou in Alaska, and their inevitable destruction by man, is given us by E. W. Nelson as follows:

"When the American Telegraph explorers visited Alaska in 1866–67, Reindeer were found everywhere, and herds, containing thousands of individuals, were no uncommon sight. They were very abundant on the hills and valleys bordering upon Norton Sound, but to-day their former abundance is indicated only by the number of antlers scattered over the country, and the well-marked trails worn on the hill-sides, or leading across the valleys, showing where they passed from one feeding-ground to another.

"When the Americans first obtained control of the Territory, firearms were unknown among the natives; and when first the natives obtained guns, they kept the traders supplied with meat, at the rate of two charges of powder and ball for a Deer. One winter, just preceding the transfer of the Territory, an enormous herd of Reindeer passed so near Saint Michaels that a 6-pounder loaded with buckshot was fired at them, killing and wounding a number of them. As soon as firearms were introduced among the people, they began to slaughter the Deer, with true aboriginal improvidence. Hundreds were killed for their skins alone, and nearly as many more were shot down, and left untouched, merely for the pleasure of killing.

"In the course of a few years this indiscriminate slaughter began to tell, and during the years I passed at Saint Michaels, and in exploring the country in which they were so abundant formerly, I failed to see a single living Reindeer. I saw their tracks a few times during my sledge journeys, and each fall and winter, from two to a dozen were killed within 50 miles of Saint Michaels. They were very abundant on Nunevak Island, in 1877 and 1878, but are nearly exterminated there now.

. . . . . .

"In the summer of 1880, one man from Point Barrow took about 500 skins, and many others took nearly as large a number. Only a few stragglers now remain on the Kaviak Peninsula, and in the country between the Yukon and Kuskoquim rivers.

. . . . . .

"When Mr. [William H.] Dall came down the Yukon in the spring of 1867, he saw over 4000 skins of Reindeer fawns hanging up in a village near Anvik, and at present (1887) scarcely half a dozen Deer, old and young, are taken yearly in that district."[47]

[47] Nat. Hist. Coll. Alaska, 1887, pp. 285–86.

R. M. Anderson gives the following: "Not many years ago, the coastal plain of Arctic Alaska from Point Barrow to the Mackenzie was the pasture of vast herds of Caribou. Only an occasional scattered band is now seen. . . . The Caribou are practically extinct around Point Barrow, and our party in summer found only a few between Cape Halkett and the Colville, a herd of perhaps 400 in the Kuparuk River delta (the only large band seen by anybody in northern Alaska that season) and other small bands as far east as Demarcation Point. Around the mouth of the Mackenzie, the Caribou have practically disappeared, although stragglers are occasionally seen on Richard Island and in the Eskimo Lakes region. Few are now found on the Cape Bathurst peninsula, and only small numbers around Langton Bay and Darnley Bay. This great diminution of Caribou all along the Arctic coast from Cape Parry west has mostly occurred within the past 20 years, since the advent of whaling ships to the western Arctic."[48]

Numbers To-day

For Greenland, a similar story is to be written. Hans Egede said, in his description of Greenland, 1818 (p. 60):

"Reindeer are in some places in so great numbers that you will see whole herds of them. [Footnote:] The farther you go northward, the seldomer you meet with Rein Deer, except in the 3rd or 4th degree to the north of Disco, where they are in great numbers."

Now the rifle has done its work of extinction; and in Greenland, Reindeer are no longer to be relied on as a source of food. Fortunately, there is one large portion of their range, where the Caribou have not been subjected to the process of ruthless massacre; that is, in the central part of Barren-ground of northern Canada. Here we have reason to believe they are still in primitive abundance.

All who have seen the Caribou herds going south agree that they are in countless myriads. It offers a joyful change to think about that range as it is to-day, to fortify our mental picture with details of its reassuring truth. The Caribou are there to-day, the last of all our noble herds. Still they in their millions march, as other horned game used to do a hundred years ago.

How are we to form an idea of their numbers? The only way seems to be by watching the great migration to its winter range. In 1907, I spent the summer in the Northern prairies, the land of the Caribou, where I saw the endless small scattered herds of summer. But I was unequipped to stand an Arctic winter, so could not stay to see with my own eyes, the gath-

[48]Amer. Mus. Journ., 1913, pp. 5–6.

ering of the clans that comes, when the millions are assembled and swept by the earliest blizzard, south into the sheltering woods. I therefore collect and array the facts that are offered by witnesses more fortunate.

Warburton Pike, who saw them at Mackay Lake, Oct. 20, 1889, says: "I cannot believe that the herds [of Buffalo] on the prairie ever surpassed in size *La Foule* [the throng] of the Caribou.[49]

"*La Foule* had really come, and during its passage of six days I was able to realize what an extraordinary number of these animals still roam in the Barren Ground."[50]

From figures and facts given me by H. T. Munn of Brandon, Manitoba, I reckon that in three weeks following July 25, 1892, he saw at Artillery Lake (N. Latitude 62½°, W. long. 112°) not less than 2,000,000 Caribou travelling southward. He calls this merely the advance guard of the great herd.

Colonel C. J. Jones (Buffalo Jones), who saw the herd in October at Clinton-Colden, has given me personally a description that furnished the basis for an interesting calculation of their numbers.

He stood on a hill in the middle of the passing throng, with a clear view ten miles each way; and it was one army of Caribou. How much farther they spread, he did not know. Sometimes they were in bunches, so that a hundred were in a space a hundred feet square; but often, there would be spaces equally large without any. They averaged at least one hundred Caribou to the acre; and they passed him at the rate of about three miles an hour. He did not know how long they were in passing this point; but at another place they were four days, and travelled day and night. The whole world seemed a moving mass of Caribou. He got the impression at last that they were standing still and he was on a rocky hill that was rapidly running through their hosts.

Even halving these figures, to keep on the safe side, we find that the number of Caribou in this army would be more than 25,000,000. Yet it is possible that there are several such.

Finally, David T. Hanbury, after spending 20 months among them in the late '90's, seeing them in summer and winter as well as during the great migration, says: "The majority of the animals remain in the north throughout the year."[51] Therefore, what Jones saw, was only a part of the minority. Who now can doubt that the Caribou to-day equal in number the Buffalo in their palmiest time?

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[49]Barren Ground, p. 84.
[50]As above, p. 82.
[51]Northland, p. 120.

Their Future

To what extent are they being destroyed? I have looked into this question with care.

Indian Destruction. In 1812 the Chipewyan population, according to Drake,[52] was 7,500. Thomas Anderson, Chief Trader of Hudson's Bay Co.'s Fort Smith, Mackenzie, showed me a census of the Mackenzie River Indians, which put them at 3,961 in 1884. Official returns of the Canadian Government give them in 1905 at 3,411 as follows: Peel River, 400; Arctic Red River, 100; Good Hope, 500; Norman, 300; Wrigley, 100; Simpson, 300; Rae, 800; Liard and Nelson, 400; Yellow-knives, 151; Dogribs, 123; Chipewyans, 123; Hay River, 114.

Of these, the Hay River and Liard Indians, numbering about 500, can scarcely be considered caribou-eaters; so that the Indian population feeding on Caribou is about 3,000—less than half what it was 100 years ago.

Of these, again, not more than 500 are hunters. The traders generally agree that the average annual kill of Caribou is about 10 or 20 per man, not more. When George Sanderson, of Fort Resolution, got 75 one year, it was the talk of the country, although, as noted in the section in Winter Range, some men got 400 in an unusual winter; on the other hand, many got none. Thus 20,000 per annum killed by the Indians, is a liberal estimate to-day.

Whalers' Destruction. There has been so much talk about destruction by whalers that I was careful to gather all available information. Several travellers who had visited Herschel Island, told me that 4 is the usual number of whalers that winter in the northeast of Point Barrow. Sometimes, but rarely, the number is increased to 8 or 10; never more. They buy what Caribou they can from Eskimo, sometimes aggregating 300 or 400 carcasses in a winter; and would use more if they could get them, but they cannot, as the Caribou herds are then to the southward. This, E. Sprake Jones, William Hay and others, are sure represents fairly the annual destruction by whalers on the north coast. Only one or two vessels of this traffic go into Hudson Bay; and these, with those of Herschel, are all that touch Caribou country. So that the total destruction by whalers must be under 1,000 head per annum.

Eskimo Destruction. The Eskimo kill for their own use. Franz Boas[53] gives the number of Eskimo in the central region at 1,100. Of these not more than 300 are hunters. If we allow their destruction to equal that

[52]Book of Indians, 1848, VII.

[53]Handbook of American Indians.

of the 600 Indians, it is liberal; giving a total of 40,000 Caribou killed by native hunters. As the whites rarely enter the region, this is practically all the destruction by man. The annual increase of 30,000,000 Caribou must be several millions, and would so far overbalance the hunter-toll that the latter cannot make any permanent difference.

There is, moreover, good evidence that the native destruction has diminished. As already seen, the tribes which hunt the Barren-ground Caribou, number less than one half of what they did 100 years ago. Since then, they have learned to use the rifle; and, I am assured by all the traders, that this, strange to tell, has lessened the slaughter. By the old method, with the spear in the water, or in the pound-trap, one native might kill a hundred Caribou in one day, during the migrations; but these methods called for woodcraft, and were very laborious. The rifle, being much easier to use, has displaced the spear, but with cartridges scarce, and costing eight to ten cents each, there is a limit to its deadliness. As already seen, these hunters do not average 20 Caribou each in a year.

This, then, summarizes the facts: The Arctic Caribou have been greatly reduced in all of their range, except in the central continental part of Northern Canada; that is, the Plains between the Coppermine River and Hudson Bay. Here, even yet, they are in primitive conditions, especially in parts remote from the sea. They may number 30,000,000.

The native destruction in these parts was never more than the species could bear, although recently fostered by whalers and traders.

Finally, the whole subject has by no means escaped the attention of the wide-awake Canadian Government, represented by the Minister of the Interior, and the Royal Canadian Mounted Police. It could not be in better hands; and there is no reason to fear, in any degree, a repetition of the Buffalo slaughter that disgraced the Plains of the United States.

The Joy of Wild Life

As I gather these chapters, setting forth the Lives of America's Big Game, the chronicle looms up ever stronger as one long, shameful record, red with blood, and black with crime. For each kind, I find the same bright story at the beginning; and for each and all—or all but one or two—a nauseating finish.

Our people came, they found an earthly Eden-land teeming with big, splendid, wild animals; and proceeded to slaughter them with irresistible weapons, for no purpose other than the brutal joy of seeing them fall. The only reason why they did not use shrapnel, aeroplanes and poison gas in the

fell work, was because they did not have them. So the wilds have been desolated; and all our herds of game are so nearly gone that it gives one a thrill of unexpected joy to know that on this list there is a bright exception to the bloody rule. The Northern herds of Caribou, are still found in their millions.

To see with my own eyes this glad wonder, was the lure that took me on that long, silent trip of 2,000 river miles. I saw them—not the millions in migration indeed. But they are surely there; for I saw the scattered summer herds each day, and all day long. And I find the deep and blessed satisfaction that it gave, set forth in my greasy, blotted, Arctic journal of the time, in oft-recurring phrases such as this:

"There never is a day, and rarely an hour of each day, that we do not see several Caribou. Yet I never fail to get a sense of joy at each and every one that comes. 'There's a Caribou,' one says with perennial intensity that is evidence of perennial pleasure in the view. There never is one sighted—and we have seen thousands all told—that does not give me a happy little thrill, the thought 'This is what I came for. I am thankful that they still live, and that I am here to see them.'"

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LIFE XLVI—MOUNTAIN CARIBOU

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Mountain Caribou, Black Caribou, Giant Caribou, Caribou of the Mountains, Osborn Caribou, King Caribou

Rangifer montanus Seton

(L. *montanus*, of the mountains)

Rangifer montanus Seton, 1899, *Ottawa Naturalist*, Aug., pp. 129–30.

Type Locality.—Illecillewaet Watershed, near Revelstoke, Selkirk Range, B. C.

The Mountain Caribou, with its races, is easily distinguished by its great size, and dark or even black general colour. Otherwise, it is of Caribou style and pattern.

Size. It stands 46½ in. (1179 mm.) high at the withers; is 95 in. (2409 mm.) from tip of the nose to the root of the tail; the tail is 5 in. (127 mm.) long; the head from nose to occiput is 19¾ in. (500 mm.); the hind foot, 26 in. (659 mm.); the ear, 7½ in. (190 mm.).

Weight. There are no exact figures available, but all hunters agree that it is nearly double the weight of the Woodland species, the bulls reaching commonly 500 to 600 lbs. alive.

Colour. The general colour is a deep umber brown, very glossy, and darkening nearly to black on the lower parts of the legs.

The neck is dull grayish white, also the underside of the tail, the buttocks, lips, and belly. Along the ribs on each side is a grayish patch a little lighter than the surrounding brown.

The white fringe above each hoof is shining white, and *very narrow*.

Antlers

The finest horns in the Reindeer group are those of the great Black Caribou of Cassiar (*osborni*). More than any other, these combine large size and many points with remarkable symmetry and six perfect shovels fully and evenly developed—a feature rarely seen in other parts of the mainland, although not uncommon in Newfoundland.

The longest horns claimed for the Mountain Caribou are recorded by Henry Bannon,[1] as follows: Length, 61⅞ in.; spread, 50¾ in.; points, 24.

[1]Forest & Stream, Feb., 1918, p. 77.

The longest horns recorded in Rowland Ward's book are those taken in Cassiar by F. S. Groves. They measure: Length, 58¼ in.; spread inside, 43¼ in.; points, 33.[2]

Nearly as long is C. Arbuthnot's head from Cassiar. It stands: Length, 56¼ in.; spread inside, 35 in.; points, 32.[3]

The head taken in Cassiar by Mrs. A. S. Vernay[4] is given: Length, 55½ in.; spread inside, 39 in.; points, 41.

Fifty-inch heads are common, but W. N. Beach's trophy, taken in Cassiar in 1918, is recorded:[5] Length, 50 in.; girth, 7⅜ in.; widest inside, 33 in.; points, 67.

C. T. Summerson[6] announces a Cassiar head as follows: Length, 54½ in.; spread, 55 in.; points, 37.

If we fill the missing places in the schedule with average dimensions, and total the figures, we shall have the Beach head first with 157⅜ points; the Summerson head second with 152½; the Bannon head third with 142⅝; the Groves head fourth with 140½; the Vernay head fifth with 138⅝. This method might be quite satisfactory if proper account could be taken of massiveness and symmetry.

All of the above are owners' measurements.

Races

The following forms or races have been recognized:

montanus Seton, the typical form; a black Caribou. T. l., near Revelstoke, Selkirk Range, B. C.

osborni Allen, a giant race, 4 to 5 ft. high at the shoulder, weighing 600, or even 700 lbs.; with immensely developed, massive, and flattened antlers. It is a dark brown animal with gray markings and with white nose, rump patch, undertail, underparts and line above the hoofs; a dark face, but no white eye-ring. A brown Caribou. T. l., Cassiar Mts., B. C.

fortidens Hollister, largest of the Caribou, even larger than *osborni;* deep, blackish brown in colour, with a small white throat-mane, white hoof bands, small white rump-patch, white edging to tail, and very heavy teeth. A black and white Caribou. T. l., Moose Pass, Smoky River, Alta.

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[2]Records of Big Game, 1922, p. 78.

[3]As above.

[4]As above.

[5]As above, p. 79.

[6]Field & Stream, July, 1916, p. 324.

mcguirei Figgins, a large gray and black animal. T. l., Kletson Creek, a tributary of White River, West edge of Yukon, Canada.

History

As we have already seen in the Life of the Woodland Caribou, David W. Harmon, the early traveller, wrote in 1800, of the Caribou in the Northwest, that there were two kinds, the larger being the size of an Elk and the colour of a Moose (see *ante*); the other being the light-coloured Woodland Caribou.

In 1827, Cuvier[7] distinguished: the Caribou of the Woods; the great Caribou of the Rocky Mountains; and the Labrador or Polar Caribou. For the great or King Caribou, he suggested the name *coronatus*[8] but did not clearly identify it nor assert a locality, although Griffith adds that he suspects it to be the Kistuhe of the Kluché Indians of the Rocky Mountains.[9] Kluché seems to be a form of Loucheux or Koluch.

Richardson, in 1854, described the Mountain Caribou or Giant Caribou, but did not name it.[10]

In 1889, Dr. Geo. M. Dawson, of the Canadian Geological Survey, secured a huge, dark Caribou from the mountains of British Columbia. This specimen, a male, is now mounted in the Museum of the Survey at Ottawa. In 1899, I made it the type of the new species *montanus*.

Two years later, A. J. Stone discovered the Giant Caribou of Cassiar, which Dr. J. A. Allen named *Rangifer osborni*.[11]

In the summer of 1911, Ned Hollister went collecting in the Mount Robson region of British Columbia near Jasper Park. While there, he discovered a new race of Caribou, still larger than *osborni*. He called it *Rangifer fortidens*.[12]

Range

The range of this group extends through the Rocky Mountains, from about latitude 49° to the south central part of Alaska. In general, it is believed that *montanus* occupies the south part; *fortidens* the headwaters of the Fraser and Athabasca, while from Cassiar northward is the territory of

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[7]The Animal Kingdom, Griffith's Ed., V, pp. 304-05.
[8]As above, IV, pp. 78-79.
[9]As above, IV, pp. 83-84.
[10]Voy. of Herald, p. 20.
[11]Bull. Amer. Mus. Nat. Hist., April 16, 1902, p. 149.
[12]See Smiths. Misc. Coll., No. 35, p. 3, Feb. 7, 1912.

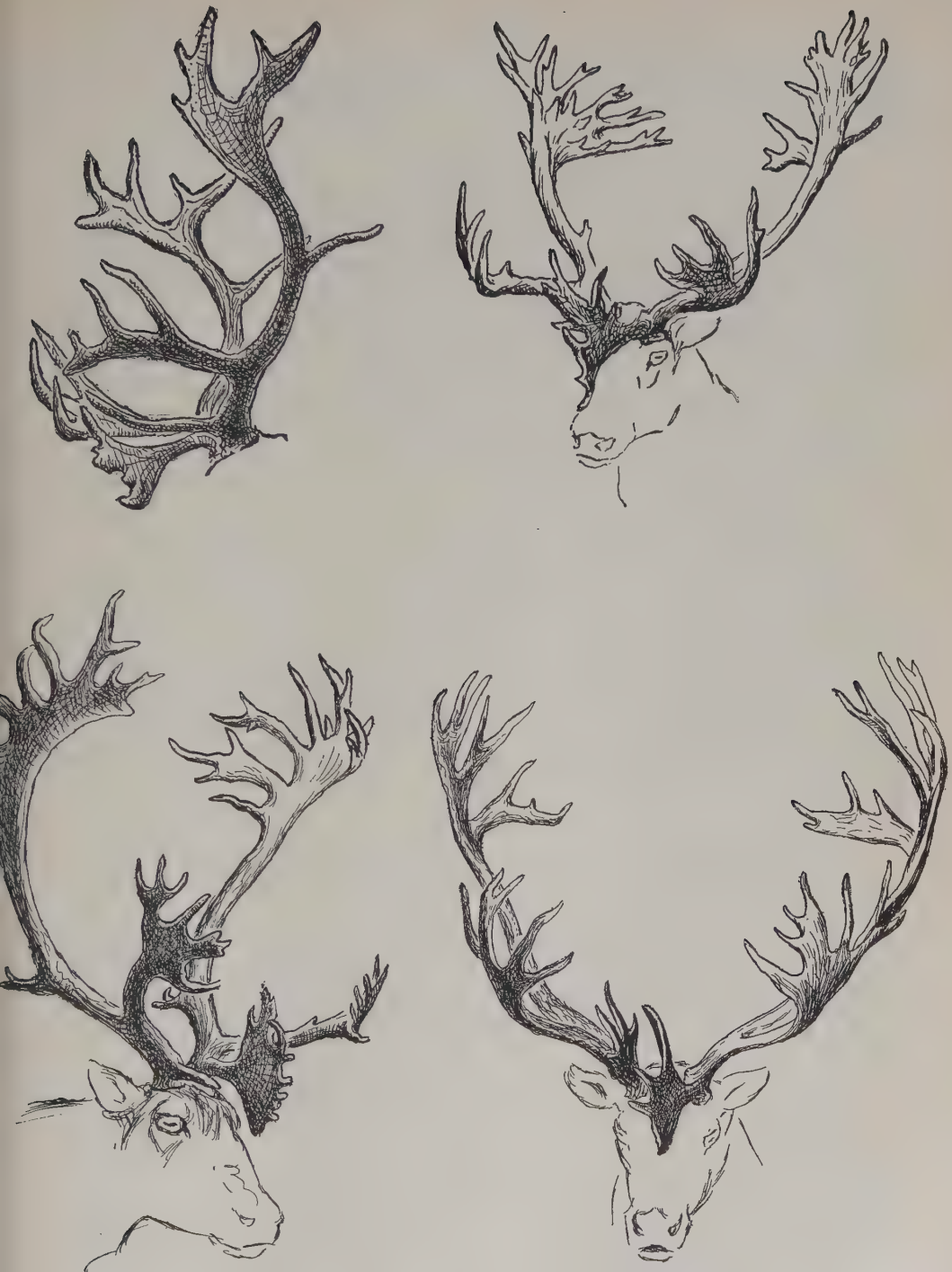

PLATE XXIV.—ANTLERS OF MOUNTAIN CARIBOU

osborni. This is believed to grade into *mcguirei*. But there is much uncertainty about the distribution of all, as well as their relationships.

Haunts

A. J. Stone, who first pointed out the characteristics of the Osborn or Cassiar Caribou, says: "The habitat of the Caribou in the Cassiar region is entirely different from that of his Woodland cousin. . . . His range is in high land almost free from timber. He never penetrates the timber in summer or fall, and rarely in winter, only in cases of continued storms. He inhabits much the same kind of country as the Sheep, sometimes going lower than he, into the high valleys, but declining to follow him to his highest feeding grounds. I have trailed the Caribou on the crests of high, rocky ridges where one would scarce expect them to find safe footing, and have found them feeding near a band of Sheep, the latter nibbling the slender grass which grew among the moss, the former feeding on the moss itself."[13]

Belmore Brown, who knew them well on their native range, says:

"The mountains that loomed about us were typical of the country ranged by the Osborn Caribou. The land rose to a great height above the surrounding valleys, until it broadened out on top into an immense plateau that rolled away to the north for forty miles. Here and there it shouldered up in miniature mountain systems, snow-capped, and bare of vegetation, but in general it rolled away in level plains where gray blankets of lichens lay between the rocks and snow fields."[14]

Numbers

In the primitive days of 1890, the Caribou in southeast Alaska certainly ran into the millions.

Then came the rush of hungry miners who shot at all seasons, and slaughtered without let or hindrance. The Caribou numbers rapidly diminished in all the Klondike regions and parts contiguous to it. Yet, even as late as 1909, according to Bill Stoner, the old-timer, there were vast herds. He says:

"On the Sixty-Mile River last year, the herd was weeks in crossing; and those who watched them during all the time said the total must have run into the hundreds of thousands, while some thought a half a million to a million would not be putting it too strong."[15]

Dr. W. H. Chase, recently discussing Alaska big game, says: "Only a

[13]Recreation, May, 1899, p. 341.

[14]Outdoor World and Recreation, Jan., 1914, p. 26.

[15]Forest & Stream, Jan. 22, 1910, p. 132.

few short years ago, as many as 100,000 Caribou could be seen in the migratory herds which crossed the mighty Yukon River, travelling from the barren Arctic slopes, where they are wont to graze during the summer months, to the vast and wooded southerly slopes of the Alaskan Range, where they may obtain food and protection during the rigours of winter.

"Within the past 10 years, these herds have been disturbed and killed off until it is doubtful if there remain 20,000 animals in the main herd."[16]

But this was the work of the meat-hunters who catered for the miners. Now the operative forces are changed; miners are greatly reduced in numbers. Alaska's population has fallen considerably. Wise game laws have been enacted, and already good results are seen.

William N. Beach, President of the Camp Fire Club, writes me that, in the fall of 1921, "Dall Sheep and Osborn Caribou are in hundreds and thousands all through the country" between Cook's Inlet and the Yukon. So much for Alaska.

In the Cassiar region of northern British Columbia, a different condition prevails; and from all accounts, the King Caribou are not only abounding there still, but for unknown reasons, are more numerous than ever before in history.

The editor of *Forest & Stream* writes in his December issue, 1918, concerning game in Alberta: "William Rindsfoos, who just recently left Jasper Park for the Wapiti River country northwest of the railroad, is making his second expedition into this territory, drawn by the remarkable amount of game he saw last year. He reported at this time coming within shooting distance of 165 Sheep, 60 Caribou, 80 Moose, 19 Goats, 2 Grizzly-bears, 6 Deer, 14 Coyotes, and 2 Foxes."

This seems to represent the relative numbers of game under happy and primitive conditions.

Similarly, Harry L. Ferguson says, concerning "A Cassiar Hunt in 1906": "On the trip, W. and I saw the following animals which were entered in our notebooks each night; and whenever estimated, as was only done in the case of Caribou, a conservative estimate was always given so as not to be over the correct numbers. Wolverine, 2; Blackbear, 2; Fox, 5; Wolves, 9; Moose, 16; Sheep, 88; Goats, 93; Caribou, 276."[17]

Habits

The preference of this creature for life in the uplands is noted by most observers. In escaping from the hunter, the Woodland Caribou commonly

[16]Outdoor Life, Dec., 1922, p. 416.

[17]Forest & Stream, Jan., 1920, p. 38.

makes for swamps, lakes, or other wet footing. But the great Caribou of the Mountains shows another spirit. According to A. J. Stone: "Like the Sheep, the [Osborn] Caribou strives when frightened to pass above the cause for alarm. This is evidence that they consider the heights their home."[18]

Similarly, the same writer remarks the propensity of the doe to seek a secret place in the heights when her climax comes. "The females," he says, "climb well into the mountains early in the spring to bring forth their young in seclusion; the males follow the snowline back, and remain there until the approach of winter drives them down once more to the high bald knobs."[19]

In all other habits, so far as recorded, it resembles the Woodland Caribou.

[18]Recreation, May, 1899, p. 342.
[19]As above, p. 341.

LIFE XLVII—QUEEN CHARLOTTE ISLAND CARIBOU

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THE LAST OF THE RACE

Dwarf Caribou, Queen Charlotte Island Caribou, Dawson Caribou

Rangifer dawsoni Seton

(L. *dawsoni*, in honour of Dr. Geo. M. Dawson, of the Canadian Geological Survey, who first called attention to the animal's existence.)

Rangifer dawsoni Seton, 1900; *Ottawa Naturalist*, Feb., 1900, pp. 257–61.

Type Locality—Graham Island, Queen Charlotte Island Group, B. C.

"The most striking characters of the species are small size, imperfect development of antlers, and absence or indistinctness of the usual colour markings. Throat mane feebly developed, reaching from throat nearly to forelegs, longest in middle, longest hairs 6 in. (150 mm.)"[1]

That is to say, it is a runt, the last remnant of a worn-out, dying race.

Size. Total length, 4½ ft. (1369 mm.); tail, 3 in. (75 mm.); hind foot, 15 in. (381 mm.); height at shoulder, 2 ft. 9 in. (837 mm.). That is, little more than half the dimensions of the Great Mountain Caribou, which is geographically nearest to it.

Colour. In general, of a mousy gray, becoming darker and browner on the head, without white or black anywhere. This is the only Caribou that does not conform to the pattern of the family uniform; faint traces of this at most, are seen.

Merriam's description is as follows:

Colour and Markings in Fall Pelage (November)

"Colouration remarkably uniform and pale throughout, the usual dark areas indistinct or absent. General body colour drab; top of head from edge of nose pad to horns, pale drab chocolate; top and sides of neck, pale drab gray, varying to buffy whitish, followed on shoulders by darker drab, but without trace of 'cloak'; shoulders, upper half of back to tail, and outer side of thighs, drab; flanks grayish, with indication of dark horizontal band below (just outside of white of belly); fronts and outer sides of legs and thighs paler drab, melting gradually into grayish white of ankles; inner sides of legs whitish, without line of demarcation; upper side of tail drab;

[1] C. H. Merriam, in Sheldon's Wilderness, Nor. Pac. Ids., 1912, p. 233.

slightly paler than back; under side of tail whitish; rump patch absent, but sides of rump posteriorly, below plane of tail, faintly paler than above; nose pad, lips, ring around eye, ears, chin, throat, and ankles whitish; no markings on feet or ankles, the whitish of these parts passing insensibly into the pale drab of the legs.

Young

"The young cow is a little more strongly marked than the adults: dark colour of head reaching farther back (to occiput); back and rump darker; flankband slightly more distinct."[2]

Antlers

Small, short, and poorly developed, without palmation, and with little or no flattening and few "points"; in a word, the product of a race that is run out, and ready to die unless saved by an infusion of new blood.

History

The following is an extract from my original article which appeared in the *Ottawa Naturalist*, XIII, Feb., 1900, pp. 257–61. Three drawings of the skull were given.

In August, 1899, while at Ottawa, my attention was called by Dr. Geo. M. Dawson, of the Geological Survey, to the fact that Caribou exist on the northernmost and largest island of the Queen Charlotte group.

A fortnight later, I was in Victoria, Vancouver Island, and had an interview with W. Charles, at his home on Fort Street. Mr. Charles was Hudson's Bay Co.'s factor at Victoria for years, and the Queen Charlotte Islands came within his official district. He informed me that, while visiting at Masset in the north end of Graham Island, he several times heard reports that Caribou were found on the island. But the Indians never brought any in, for they have a superstitious dread of the interior and of the West coast, where the Caribou are found. They believe that if they go there, they will be devoured by some fabulous monster that comes up from the sea. At best, they are poor hunters, and rarely think about the chase when they can get a meal of fish.

One day in 1882, when Charles went as far as the west slope of the mountains on the Pacific side, he noticed a great extent of beautiful, level upland pastures; and remarked that if there were any Caribou on this island, this would be the place to look for them. Accordingly, Alex. Mackenzie, an ex-employee of the Hudson's Bay Co., set out with some Siwash Indians.

[2]C. H. Merriam, in Sheldon's Wilderness, Nor. Pac. Ids., 1912, pp. 233–34.

Fig. 2.

Fig. 3.

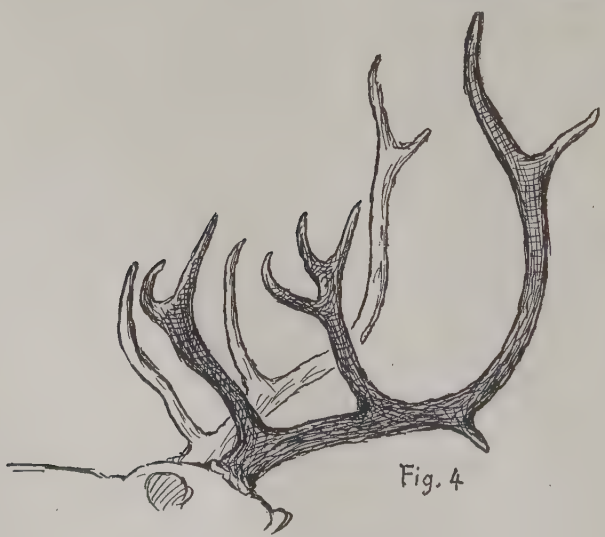

Fig. 4

PLATE XXV.—DAWSON CARIBOU

Figs. 1 2 3, are drawings of the type specimen reproduced from my original paper. Fig. 4, from specimen taken Nov. 1, 1908, shows the spindly undeveloped antlers. The left is 36½ inches long; the right, 32½.

Finding near the place a large herd of Caribou, they opened fire on them. The first to fall had only one horn. They brought its skin and skull to Mr. Charles, who states that the skin was of a mouse-colour, and the animal too small for the Woodland Caribou, and too dark to be the Arctic species. He is of the opinion that it is closely related to the Barren-ground Caribou. The skin was destroyed, but the fragmentary skull with its one horn was deposited in the Provincial Museum of Victoria, B. C.

Through the courtesy of John Fannin, I have had the opportunity of making a thorough examination of the skull in question, and am convinced that the animal is entitled to formal recognition. I therefore named it in honour of Dr. G. M. Dawson, of the Canadian Geological Survey, the eminent explorer of the Queen Charlotte Islands.

Rangifer dawsoni, sp. nov.

Sp. Character.—Its small size, about that of *Rangifer arcticus*, and its colour, which is darker than that of *arcticus*, but much lighter than that of *montanus* from the interior of British Columbia.

Habitat.—Queen Charlotte Ids., the type being from the interior of Graham, which is the northmost large island of the group.

In June, 1900, Dr. Wilfred H. Osgood made a collecting trip to Queen Charlotte Islands. He investigated carefully the Caribou question. He found no material evidence of Caribou on any of the islands, suggests that the antlers in question were imported from the mainland, and concludes that it does not seem safe or advisable to recognize *Rangifer dawsoni* as a distinct form.[3]

In the fall of 1906, Charles Sheldon, of Washington, D. C., spent a strenuous month on the north part of Graham Island, searching for the creature. He found tracks and dung in many places, but saw no Caribou; and records:

"It was clear that the tracks I had seen indicated very few Caribou, and that these kept mostly in the woods skirting the edges of the barrens."[4]

"November 1, 1908, Matthew Yeomans and Henry White, two half-breeds, were hunting in a large swamp-barren three or four miles inland, midway between the mouth of the Naden River and Kung—one of the barrens south of my camp, and through which I had tramped several times. Near the center of the barren, they saw 4 Caribou—2 bulls with horns, a cow, and a calf. The animals seemed to have no fear of man, for they stood

[3]N. A. F., No. 21, 1901, p. 28.

[4]Wilderness of the North Pacific Coast Islands, 1912, p. 162, also pp. 129–67.

quite still until one after another, except the calf, were shot down. The skins and skulls were sent to the Provincial Museum in Victoria, where I inspected them in the fall of 1909, as they were about to be mounted.

"Mr. Harrison, who communicated to me the above facts, has advised me in a letter, dated Aug. 1, 1910, that no Caribou have since been seen. After the killing, the British Columbia authorities immediately placed the Caribou of the Queen Charlotte Islands under the protection of the law, and prohibited the shooting of any more of them.

"So far as known at present, therefore, the Caribou ranges in Graham Island north of latitude 54°."[5]

A full description of these specimens by Dr. C. Hart Merriam, with photographs, etc., is given in the Appendix C of Charles Sheldon's book as above, pp. 233–35. This has already been quoted.

Since that time, many hunters and prospectors have been on the lookout for this island Caribou, but none have been seen; and the opinion is gaining ground that these half dozen were the last and dying remnant of the species, and that the Dawson Caribou is now extinct.

Here, however, is a noble chance for an easy restoration. The Island is without Wolves or Wolverines, the Bears are scarce and harmless. A dozen pairs of Caribou imported from the mainland and turned loose, could take care of themselves, and would in a few years repopulate these congenial but desolated uplands.

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[5]Wilderness of the North Pacific Coast Islands, 1912, pp. 165–66.

LIFE XLVIII—THE MOOSE

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THE MEDICINE MOOSE. E.T.S.

The Moose, The Black Moose, or Flat-horned Elk

Alces americana (Clinton)

(Gr. *Alces*, an Elk; L. *americanus*, American)

Cervus americanus Clinton, 1822, Letters on Nat. Hist. and Int. Resources of N. Y., p. 193.
Alces americanus Jardine, 1835, Nat. Lib. XXI, p. 125.

Type Locality—"Country north of Whitestown"; probably western Adirondacks, N. Y.

French Canadian, *L'Orignal* or *l'Orignac.*
Cree, *Moose, Moos-wa.*
Ojibway, *Moose.*
Chipewyan, *Ten-neé.*
Sioux, *Ta.*

The genus *Alces* (Gray, 1821) has all the characteristics of the Family (the *Cervidæ*) to which it belongs; but, further, has broadly palmated antlers, found only on the ♂; pendulous, muscular muzzle, with a small, naked triangular space between the nostrils; short neck and tail; small tarsal and no metatarsal glands; both sexes carry on the throat a bell or dewlap covered with long hair. In size, these are the largest of living Deer, equalling or exceeding a Horse in stature.

The mane and the hair on each hip are erectile, and serve as means of expression.

Teeth: Inc. $\frac{0-0}{4-4}$; can. $\frac{0-0}{0-0}$; prem. $\frac{3-3}{3-3}$; mol. $\frac{3-3}{3-3} = 32$

Colour. A fine bull Moose shot near Kippewa, Que., by Mrs. E. T. Seton, Sept. 25, 1905, in good condition, was black on fore legs, breast, shoulders, flanks, and hams, shading into rusty brown on withers, back, neck, and head; palest on nose and lips, and shading into white on the belly; the insides of the ears also were whitish; the legs from the knee to the ground were of pale warm gray or Caribou colour. The appearance of this animal

at a distance was that of a black beast, with brown head, and white stockings. This is typical of all Eastern Moose. The coat fades toward springtime.

The sexes are much alike.

The calf is dull reddish brown without spots; it turns darker at three months. According to the Ottawa guides, the ♂ calf is darker than the ♀, and less brown. The difference is obvious when there are twins.

A keen observer, who is also a hunter and trapper of note, J. G. Rich, of Bethel, Maine, sends the following:

"We have in the Maine woods two kinds of Moose—the tall, long-geared, slab-sided, gray-coloured; and the short-legged, round-bodied black Moose, or almost black. We distinguish them as 'black' or 'gray.' We have never known the two kinds to yard together in winter or mate together in summer."[1]

This observation has so often been made by the men of the woods, that it behooves the scientists to investigate carefully the testimony.

Colour Freaks. As with most Deer, a number of albinos have been found.

The melano is not recorded; but a red phase is reported by T. F. Clarke, Provincial Game Guardian of Saskatchewan, as follows: "While patrolling through the Fort à la Corne Game Refuge on February 17th, I saw a bull Moose of a dark red colour. I got within 150 yards of this animal in a fairly open place. He was a large animal, but very thin. The entire animal was as red as a cow Elk, except its head and legs which were a light buff or almost white.

"I have seen Moose of varying shades of black, brown, and gray; and have heard of red Moose being taken around Hudson Bay Junction, but this is the first one of a freak colour I have seen."[2]

Size. The Kippewa bull killed by Mrs. Seton measured as follows: Length, 9 ft. $6\frac{1}{2}$ in. (2,903 mm.); snout to occiput, 2 ft. 5 in. (735 mm.); tail, $2\frac{1}{2}$ in. (63 mm.); hind foot, 2 ft. $7\frac{1}{4}$ in. (792 mm.); height at shoulders, 6 ft. (1,826 mm.); length of ear, 10 in. (254 mm.); spread of antlers, $57\frac{3}{8}$ in. (1,455 mm.).

The ♀ runs 10 to 15 per cent. less in size.

Height. An ordinary bull Moose stands 6 ft. high at the withers.

Charles H. Stonebridge, of New York, tells me that, while hunting at Chesuncook Lake, Maine, in Oct., 1897, he killed a bull Moose that was 6 ft. 8 in. at the withers after skinning.

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[1]Forest & Stream, June 29, 1895, p. 528.

[2]Rept. of Chief Game Guardian Sask., 1922, p. 24.

W. J. Hayes, of New York, records[3] that a young Moose, shot in Nova Scotia, stood 6 ft. 9 in. at the shoulders; although on examination of the teeth, horns, etc., it proved to be only three years old.

William L. Roberts, of Springfield, Mass., is stated[4] to have killed a Nova Scotia Moose that measured 6 ft. 10 in. at the withers.

One still larger, taken in New Brunswick by Carl Rungius, the animal painter, measured 7 ft. at the withers as it lay on the ground.[5]

But the record-bearer in point of stature among Eastern Moose was killed at Mattawa, Que., in Oct., 1895, by Dr. Hamilton Vreeland and his brother. It stood 7 ft. 4 in. at the withers.[6]

Thus far, I have dealt only with the Canadian Moose. The Alaskan, of course, overtops it. The largest that I have found recorded by any competent authority was killed and measured by Dall de Weese on the Yukon in Sept., 1897; and was 7 ft. 8 in. at the withers.[7]

But from British Columbia a still taller one is recorded by William N. Beach, President of the Camp Fire Club. In the fall of 1918, he killed a Cassiar Moose that measured from heel to hump 8 ft. 7 in. The horn spread was $63\frac{1}{2}$ in.[8]

It is well to remember that the height of a Moose standing is much less than the distance from hoof to withers in the dead animal—in some cases, 8 or 10 in. less.

Weight. Not many authentic weights of Moose have been recorded, because of the difficulties of getting the scales and the Moose together. For long, we had nothing but hunters' guesses, which, of course, are of the same order as fishermen's. Now, however, we have some trustworthy evidence.

The only Moose I ever killed gave 500 lbs. (Fairbanks scales) of dressed meat, which, according to butchers' reckoning, would be a live weight of 900 lbs. As he lay, he measured 6 ft. 2 in. at the withers, which means about 6 ft. alive. He was of medium size.

The Moose killed by F. C. Selous in the Kippewa country, Sept., 1900, weighed 862 lbs. This was after the paunch, entrails, and blood were removed, so that he easily weighed 1,100 on the hoof. This was "a fair-sized bull Moose of about 5 years old."[9]

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[3]Am. Nat., June, 1871, p. 251.
[4]Forest & Stream, Nov. 25, 1899, p. 426.
[5]Hornaday, Am. Nat. Hist., 1904, p. 140.
[6]Recreation, Feb., 1896, p. 65.
[7]Recreation, Feb., 1898, p. 151.
[8]Field & Stream. June, 1919, p. 141.
[9]As above.

S. L. Crosby, of Bangor, Maine, an undoubted authority, after weighing several Moose, says: "The heaviest Moose I ever weighed tipped the scales at 1,009 pounds net; and the blood and entrails would surely have weighed 250 to 300 pounds more."[10]

By actual weight, I found that a 562-lb. bull Wapiti lost 120 lbs. when his blood and entrails were removed; so that Crosby's estimate appears fair, and his big Moose surely weighed nearly 1,300 lbs.

A large Moose killed near Penadomcook, Maine, by W. I. Miller, Sept., 1892, dressed 1,123 lbs.,[11] equal to a live weight of over 1,400 lbs.

R. D. Fetherston, of Vancouver, B. C., writes to *Recreation* (Sept., 1898, p. 226) that, in the fall of 1889, he and D. G. MacDonald killed 6 Moose on the Magnassippi River, Que., of which "one weighed, dressed, at Deux Rivières Station, C. P. R., 1,340 pounds. This animal did not have a good pair of antlers." This weight dressed, would mean a live weight of 1,600 lbs.

J. G. Lockhart, writing in 1865 of the Alaska Moose, says that those "down at Peel River and the Yukon are much larger than up this way [Great Slave Lake]. There I have known two cases of extraordinary Moose having been killed; the meat alone of each of them weighing about 1,000 pounds."[12] This implies a live weight of 1,700 or 1,800 lbs. These, however, are guesses, albeit by a good man.

Races

Four forms of American Moose are recognized:

americana Clinton, the Canadian or typical Moose. T. l., probably western Adirondacks, N. Y.

gigas Miller, the great Alaskan Moose, which differs from *americana* chiefly in being much larger, and more richly coloured. T. l., Kenai Peninsula, Alaska.

shirasi Nelson, differs from *americana* in having entire top of back pale yellowish or rusty brown; ears, paler and grayer; hoofs, much shorter and smaller. T. l., Snake River, Lincoln Co., Wyo.

columbæ Lydekker, distinguished chiefly by its T-shaped, instead of triangular, patch of bare skin on muzzle. T. l., British Columbia; possibly, however, Ontario.

[10] Recreation, Jan., 1896, p. 89.

[11] Recreation, March, 1895, p. 249.

[12] Habits, p. 307.

The Bell

A marked peculiarity in the Moose, male and female, is the bell on the throat. I have examined many of these in the newly killed specimens, and in the living animal; and could find nothing in them but a long dewlap of skin with appropriate blood-vessels. Sometimes it is round; sometimes flat, lying the long way; sometimes flat the cross way of the animal's throat; sometimes simple; sometimes forked; sometimes hanging from the jaw, and sometimes from a long blade-like dewlap, but always without discernible scent-glands. I have squeezed and worked them with my hands on the living Moose, and have been unable to discover any smell or signs of exudation; or, indeed, any specialization that would afford a hint of their purpose. No one yet has given any satisfactory explanation of this curious dangler.

The "bell," as we have seen, is an extremely variable feature; it is found in the young of both sexes, but tends to disappear with age. Therefore, it may be a character that is being lost because it no longer answers any useful purpose.

The big bull Moose shot at Chesuncook Lake, Maine, by Charles H. Stonebridge, Oct., 1897, had a 20-inch bell, of which the hair was about 4 inches.

Another which I examined in Crosby's studio, Bangor, Maine, had a 25-inch bell, not counting the hair. This is now in Newark Athletic Club.

The big bull killed by Henry M. Church, of New Bedford, Mass., about 1896, had a 14-inch bell, which "is a split or double bell."[13]

On Aug. 24, 1904, at Winnipeg, I had the opportunity of carefully examining three young living Moose—a 1-year-old male, a 2-year-old male, and a 2-year-old female. All three had bells; that of the older male was biggest, being about 4 inches long.

George Linklater, my Kippewa guide, says he never saw a cow Moose without a bell—sometimes small, but always present. The other guides in camp gave similar testimony.

Thus, it is found on all Moose with little regard to age or sex, though usually largest in the young bull. The longest bell I ever heard of, however, was found on a cow Moose. Ordinarily, it is 8 or 10 inches long; 14 inches would be exceptional for even a bull; but this one was *38 inches long*, exclusive of hair (see Plate). The Moose that wore it was shot by an Indian in eastern Manitoba. He brought the head to Darbey's taxidermist shop in Winnipeg. The naturalists E. W. Darbey and J. P. Turner, of Winni-

[13]Recreation, Dec., 1897, p. 504.

peg, examined it critically in the flesh, and vouch for the genuineness of this extraordinary bell. Unfortunately, the owner insisted on having it mounted on a bull Moose head.

Fred. Talcott, who made extended observations on a family of Moose in Roger Williams Park, Providence, R. I., writes:

"As the antlers increased, the bell also increased until 13 or 14 inches long; and after the antlers were dropped, December 1st, the bell decreased in length."[14]

It is interesting to note that several animals have produced "Moose bells" on their throats as freaks. I have seen such growths in Common Cattle, Belgian Hares, Merino Rams, and once in a Cottontail Rabbit. They are usually associated with other excessive developments of the skin and its products.

"The Indians call the pendant 'mousomodai' meaning literally 'Moose bottle'"[15]

Cysts and Growths

Another curious thing in Moose anatomy was reported to me by William J. Tweeddell, of Woonona, Manitoba, July 5, 1901. He asked me if I ever heard of the *Peeto-mong-sons* or "Little Moose in the Big Moose." One Moose in about 500, he said, has a little medicine Moose in its skin. When this is found, it is cause for much rejoicing among the Indians. It is carefully preserved as "great medicine"; and the man who finds it, is believed to have secured a mascot of eternal good luck in Moose hunting.

Cross-examination did not shake his evidence. It was not a fœtus—Tweeddell was sure of that. It was *in the skin*, and usually in that of a bull Moose. He had seen two; the most recent one was about a foot long; it had hoofs and hair, but no bones. Also, he had seen the same sort of thing among Rabbits.

Robillard, my half-breed guide on the Athabaska in 1907, told me of an Indian, Maurice Bouchier, who found one of these curiosities. He carried it always for luck, and especially would not go Moose hunting without it. He got it ten years previously. Robillard had seen these growths in Rabbits also.

The explanation of the mystery is not far to seek. It is well known in surgery that, within the skin, may be formed a pocket in which are developed skin, hair, teeth, nails, or any other product of the skin. These are known as dermoid cysts. They have no established relation to age, sex, or bodily

[14]Forest & Stream, March 25, 1899, p. 224.

[15]Charles H. Baker, in letter.

locality. They are best known in the human species, because they have been most looked for there. Yet here, evidently, was a case of dermoid cyst in the Moose, observed by a reliable and educated man.

Dr. Gordon Bell, of Winnipeg, explains such developments as "*fœtus in fœto.*" Of this, I met with a strange case at Meeker, Colo., Oct. 4, 1901. Dr. J. W. Collins, the veterinary, showed me a fœtus of apparently three months' development, that had been aborted the night before by a 15-month filly that was still sucking her dam. We examined the case together; there was no possibility, he said, of a male parent being concerned.

Reference to the Woodland Caribou Life will show record of a cognate growth in the Caribou, in connection with which is discussed a dermoid cyst found in the neck of a Moose.

George Linklater, of Deux Rivières, tells me that in June, 1904, he had a close view of three Moose—probably a family—crossing Lake Caughnawanna, 40 miles east of Kippewa. One was a big bull, another a yearling bull, and the third an old cow. The big bull had four or five tumours hanging to his back and shoulders. They were each about 3 inches across, and hung by a narrow neck to the skin, swinging about as he moved. His hair was so short that he seemed naked.

History

The intrepid French voyageurs of the Sixteenth Century were the original explorers of northern North America, and the first civilized men to see the Canadian Moose.

When they met with the Wapiti, the Virginia Deer, the Bear, and the Wolf, they, not being trained taxonomists, had no difficulty in satisfying themselves that these were identical with the animals they had known in *la belle France;* and named or misnamed them accordingly. The Wapiti became the "*Cerf du Canada*"; the Virginia Deer the "*Dain*" or Fallow Deer; the Bear and Wolf were yet more easily catalogued. But when these enterprising travellers found themselves confronted with the Moose, they were silent—puzzled. Nothing like this had ever been seen "at home." They adopted, therefore, the name given it by their Basque followers.

We learn from Lescarbot that, "the Basques arrived on the coasts of America, gave to the Moose (Élan) of Canada the name of 'Orenac,' and that 'Orenac' means 'Deer' in Basque."[16]

The educated Frenchmen who had a literary knowledge of the European Elk, made a feeble attempt to call this animal by its European name. Les-

[16]Hist. de la Nouvelle France, 1615, Ch. XX.

carbot, writing about 1609, of "The Chase" in New France, says: "But first let us speak of the Ellan, which they [the Indians] call Aptaptou, and our Basques, Orignacs. . . . It is the most abundant game which the savages have after the Fish."[17] Sagard-Théodat calls them "Eslans ov Orignats."[18] *Orenac* was Frenched into *Orignac*, then into *Orignat*, and later into the present form *Orignal*.

Charlevoix, in 1744, uses "*élan*" once by way of explanation, and "*orignal*" elsewhere throughout. Thus, the lower-class nomenclature won; it holds the ground to-day.[19]

The English had similar troubles, with even less light, for they were farmers; and, in information and travel, they were far behind the polished French chevaliers who exploited New France. They got out of their difficulty by adopting the Indian word "Moose" which, as pronounced in an Indian nose, is *mong-soa* or *mongswa*, said to mean "twig-eater." What a blessing for our lexicographers had the early Scandinavian explorers completed their conquest, and allowed the noble creature its proper birthright in the name of *Elk!* But Moose it is, and not so bad, since it makes no confusion. Would that the Wapiti, Pronghorned Antelope, White Goat-antelope, and Bison were as happily placed!

Lescarbot's account, cited above, is the earliest mention I can find of the Moose. Cartier did not see the species in his famous journey to Hochelaga (Montreal) in 1535. At least, he does not speak of it, which is pretty good proof, since he saw and wrote of many beasts.

Also, the earliest drawing of a Moose that I can find is on Lescarbot's map (1609) of Port Royal, Nova Scotia. The Moose (or *l'orignal*, as he calls it) was the characteristic animal of that region, and therefore used as decoration of the map at *Rivière de l'orignac*.

Range

The map shows the ancient range of the Moose but little changed to-day. The parts where it is known to have been exterminated by man, make a remarkably small total, comprising, chiefly, Prince Edward Island, Cape Breton, and a strip in the United States along the southern border of the tinted area. The range of the Moose was actually more limited thirty years ago than it is to-day; for good game laws have resulted in a general

[17] Hist. de la Nouvelle France, 1618, p. 893.
[18] Hist. du Canada, 1636, p. 308.
[19] Hist. Descr. Gen. Nouv. France, 1744.

MAP III.—RANGES OF THE MOOSE AND THE COLLARED PECCARY

By E. T. Seton, with assistance of the Biological Survey

Range of the Moose in primitive times; to-day but little changed except that it is extinct in Pennsylvania and New York. The crosses are records discussed in the text.

Range of the Collared Peccary and its eight races (chiefly south of the United States boundary).

increase of its numbers over much territory where once it was near extermination.

There is one oft-quoted error that requires correction. Richardson, Caton, and many others, who should have known better, say that formerly the Moose *ranged south to the Ohio.* All these writers refer to DuPratz as authority, but not one of them seems to have looked up DuPratz. Here is his whole statement:[20] "This is what we call the Wabache, and what *in Canada* and *New England* they call the Ohio. . . . To the north of this river lies Canada. . . . On the north of the Wabache, we first began to see the Originaux." That is *in Canada.* He clearly distinguishes Canada from the land of Illinois, which name he applies to the country north of the Wabash on his map. Furthermore, he includes the whole of the Ohio valley as part of Louisiana; and in his list[21] of "Quadrupeds" of Louisiana, does not mention the Orignal, though he gives Buffalo, Stag [Wapiti], and Deer.

In a word, then, there is nothing in this to show that the Moose ever was found south to the Ohio.

Interesting Records

On Prince Edward Island, the Moose are now extinct, but "there are occasionally found palmated horns."[22]

New Hampshire. W. F. Daniell, Jr., of Franklin Falls, N. H., sends me the photograph of a Moose head, a bull killed by himself in New Hampshire.

Says C. F. Jackson: "During the last three weeks, a young bull Moose has been seen frequently in the town of New Ipswich which lies a short distance south from here. A fairly good photograph was secured, and there can be no doubt of the record. This is the first record for the southern part of the State for several years."[23]

Massachusetts. "The Moose is not found at present within the limits of this State, neither has it probably been taken within its bounds for the last 30 or 40 years. It may, therefore, be considered as extinct, so far as Massachusetts is concerned."[24]

"The Moose formerly undoubtedly existed in Massachusetts."[25]

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[20]The Hist. Louis., 1774, I, pp. 300–01.

[21]As above.

[22]C. Birch Bagster, Pr. Ed. Id., 1861, p. 85.

[23]Personal letter, Dec. 12, 1921.

[24]Dr. E. Emmons, Quads. Mass., 1840, p. 75.

[25]J. A. Allen, Cat. Mam. Mass. Bull. Mus. Comp. Zool., 1869, p. 159.

Vermont. "Moose were formerly very plentiful in Vermont, and in many places the early settlers depended upon their flesh for no inconsiderable part of the subsistence of their families. They are now exterminated from all portions of the State, excepting the county of Essex, in the northeastern part. There they are still found, and several were killed there during the two last winters."[26]

New York. "Numerous in the unsettled portions of the State, in the counties of Essex, Herkimer, Hamilton, Franklin, Lewis, and Warren; and since the gradual removal of the Indians, they are now (1841) believed to be on the increase. . . . .

"The extreme southern limit along the Atlantic coast is 43° 30′ in the State of New York."[27]

Although several writers on the Moose list it among the species of the Catskills, I find no historical evidence that it was ever found there.

In New York State, the Adirondacks were its last stronghold. Here it was exterminated "about the year 1861."[28]

According to the editor of *Sports Afield*, Dec., 1900, p. 549, a bull Moose was shot that year near Long Lake, Adirondacks, by Charles Martin. It weighed 812 pounds. This was almost certainly an escape from some recently stocked preserve.

Pennsylvania. S. N. Rhoads refers to fossil horns, but omits the Moose from his "Recent Mammals of Pennsylvania." Yet it seems to have been of general distribution in the North Mountains. Col. Henry W. Shoemaker writes me, Oct. 27, 1925: "As to the Moose in Pennsylvania, the best definite reference that I can give you is Dr. J. D. Schoepf's Travels in the Confederation in 1783. Dr. Schoepf was an Army Surgeon in the service of the British during the Revolutionary War; and after the peace, he took a trip through Pennsylvania, and recorded in a very observant manner all he saw and heard.

"He says that the Moose were known as the Black Moose, to differentiate them from the Gray Moose or Elk, which is the name given to them invariably by the old people with whom I have talked; although some of the early settlers of English origin called them the Mose, and the Pennsylvania Germans and Huguenots called them the Stump-harsh, because they came into the swamps among the tall black pine stumps to eat the lily-pads. Many years ago, there was said to be a set of Pennsylvania Moose horns at Heller's Tavern in the Wind Gap in Northampton County, Pa.

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[26]Zadock Thompson, Nat. Hist. Vermont, 1853, p. 50.
[27]James E. DeKay, Nat. Hist., N. Y., 1842, Pt. I, p. 117.
[28]C. H. Merriam, Mamm. Adir., 1884, p. 138.

"There are several definite stories of killing the last Moose in various parts of Pennsylvania; but I do not have them at hand, and the several Moose runs and Moose streams and Moshannon Creek perpetuate their name topographically.

"John C. French, of Roulette, Potter Co., Pa., and C. W. Dickinson, 14 Mill Street, Smethport, McKean Co., Pa., have definite recollections of Moose hunting in Pennsylvania by their grandparents and other old people."

Michigan. C. E. Haring, of Ontonogan, Mich., hotelkeeper and fur-trader, told Norman A. Wood in 1904, of seeing 2 dead Moose, killed near Ontonogan in 1863 and 1864. He ate the meat at the Indian camp.[29]

Wisconsin. "Moose were abundant in Wisconsin up to the middle of the last century, and more or less common in a few localities at a much later date. It is not unlikely that even at the present time, one or two individuals may still be found in the extreme northwestern part of the State."[30]

In a recent letter, Charles Henry Baker, surveyor, Washington D. C., writes me: "In answer, first, to your query as to the occurrence of Moose in Wisconsin, I can state positively that in 1870, this animal was comparatively numerous east and southeast of Superior (then known as Superior City), in the counties of Douglas and Bayfield, between Poplar River and the head of White River, at a distance of from 15 to 20 miles or more south of Lake Superior."

Manitoba. A. S. Barton, of Boissevain, Man., on the north slope of Turtle Mountain, assured me Sept. 13, 1904, that there were now no Moose there; the last Moose had been killed recently.

James M. Macoun of Ottawa, writes me, Jan. 25, 1911, that he and Owen O'Sullivan of the Geological Survey of Canada "saw tracks of 8 Moose this year within 25 miles of Churchill . . . about 3 miles up the Deer River."

Wyoming. In 1897, when I was in the Yellowstone Park, the Moose was considered rare. They were estimated at 50. But they have steadily increased; and in 1912, the official census gave the number at 550. They are now generally distributed in the Park and in Jackson Hole. Shiras set their numbers at 1600 in 1924.[31]

Colorado. "Remains of a Moose (*Alce americana*) said to have been killed in South Park, Colo., in 1871, were observed by the Expedition. The statement is open to doubt; if correct, it fixes the southernmost limit of the species."[32]

[29]Personal letter, Jan. 5, 1915.
[30]Cory, Mamm. Ill. & Wis., 1912, p. 75.
[31]See Section on "Numbers To-day."
[32]H. C. Yarrow, Zool. West of 100 Mer., 1875, p. 71.

Earliest known drawing of a Moose; on Lescarbot's map (1609) of Port Royal, Nova Scotia

Locked Moose antlers found in Algonkin Park, Ontario

From a photograph by Thomas W. Gibson, Toronto

Why Moose horns are so seldom found

This massive pair from near Mattawa hung in a tree for only seven years. The weather and the Porcupines have reduced them to splintered and friable bone that could not last more than three or four years and much less if on the ground. Shot at Foley's Lake by Le Royer in 1898. (He went with the Ziegler expedition.) All rotten and eaten by Porcupine, but not by Mice. Every old vein is now a deep crack. Spread on brow, now 42 inches.

PLATE XXVII.—ODDS AND ENDS—MOOSE

(?) "In the summer of 1887, I saw a small pair of well-bleached Moose antlers, on the dirt roof of a log cabin near the foot of Sweet Water Lake, about 15 miles north of Dotsero, which is a station on the Denver and Rio Grande Railway, about 12 miles east of Glenwood Springs, Colo. The cabin was at least 5 or 6 years old, perhaps twice as old. It was at that time owned by a man named Peal, who told me that the Moose was the only one that had ever been known to be in that country; and was killed while with a band of Elk or a bunch of stock, I have forgotten which."[33]

(?) *Oregon.* "About 8 years ago, while I and two others were hunting Deer on the head of the South Fork of Silver Creek, in Marion County, Ore., we found a pair of Moose horn s in a fair state of preservation."[34]

"Floyd Kendall reports that Moose formerly occurred in the Blue Mountains, but that none are now found there."[35]

Records supported only by the finding of recent antlers are to be received with caution; and especially so, when the antlers are imperfect. In several cases, the supposed fragment of Moose antler has turned out to be merely an abnormal palmation from the common Deer.

Attempts at Implantation

Adirondacks. The range of this noble animal is likely to be artificially extended within the next few years. Thus, an attempt is being made to restore the Moose to its ancient realm in the Adirondacks. Here it was once very numerous; was exterminated only as late as 1861. The restoration is in charge of a society, of which Harry V. Radford, the enterprising secretary, has sent me (1906) the following report:

"The first purchases of Moose were made by the State in 1902, and a few more were bought and liberated in 1903. In all, only 12 had been liberated—at least half of which were bulls."

Since the above was written, Radford himself has gone over the Great Divide, and the Moose restoration project has ended in failure. It is pretty well established that the whole of the stock was shot by shameless poachers, before they had a chance to breed.

Newfoundland. Moose were never found in Newfoundland, and yet the country seems in all ways suited to them. Therefore, efforts have been made by the authorities to introduce the species. Concerning these, the Secretary of the Game and Inland Fisheries Board, St. John's, Newfoundland, writes me:

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[33]H. W. Skinner, of Chicago, in letter, March 4, 1901.

[34]Abe Kromling, of Melville, Clatsop Co., Ore., in letter, Aug. 8, 1889.

[35]L. R. Dice, Journ. Mamm., Nov., 1919, p. 20.

"From a paper prepared by the late James P. Howley, F. G. S., and read by him before the Daughters of the Empire, in February, 1913, I have gathered the following information.

"'About 1878, two young Moose, male and female, were obtained from Nova Scotia, and placed at Gander Bay. Nothing definite was heard of them until one was shot in the Gander country in 1912 or 1913. This animal was a bull of about 5 or 6 years of age, and was undoubtedly one of the offspring of the original pair. In 1904, four Moose, two males and two females, were obtained from New Brunswick, and placed out near the Grand Lake. They, or at least some of them, have been reported several times since.'

"I may add that the head of the one shot in Gander country was well mounted, and kept in the Game and Inland Fisheries Board office until 1920, when it was sent to the local Museum, and from there, sent across to the British Empire Exhibition at Wembley last year.

"There is in this office also a set of antlers taken from a carcass found on the shores of the Gander River during the spring freshets of 1919.

"Reports of Moose are coming more and more frequently from different parts of Newfoundland, showing that they are gradually increasing; particularly around Deer Lake, Grand Lake, the Upper Humber, and Serpentine River on the western sections of the island, and on the Gander country which covers a large portion of the east."[36]

In a word, then, the undertaking has been crowned with gratifying success. The animals are accorded complete protection; and, under the ordinary rate of increase, the Moose in Newfoundland to-day should total over 2,000.

It is to be hoped that the authorities will not lose the chance to inject some Alaska blood, and so set the Newfoundland Moose in the front rank.

Home Range

No wild animal roams at random. All have a certain range that they consider home. Some have two—one for summer, the other for winter; these are called migratory animals. The Moose has but one home, and to that it keeps the year round. As a general rule, the extent of an animal's range corresponds somewhat with its size. A Deer's range is larger than that of a Rabbit, because its wants are greater. Flesh-eaters are, of course, on a different basis. The Moose appears to be the widest ranger of the non-migratory ruminants.

[36]Letter, Dec. 29, 1925.

The Carberry Swamp, Manitoba, was the home of a small band of Moose that never left its limits at any time, so far as I could learn; though it was but 3 miles wide by 10 long. The Moose that inhabit the east slopes of the Teton Mountains in Jackson Hole, Wyoming, are known to continue all year in a narrow belt about 3 miles by 10 on the east of Jackson Lake. In the Bitterroot Mountains, a few individuals live in the narrow valleys on the west slope of the mountain; and though these valleys are rarely over half a mile wide, the Moose seem content to dwell permanently in a part of them that is not more than 2 or 3 miles long.

Fred Reeves, my guide in the Caughnawanna region of Quebec, says: "For 5 years I have known an old gray cow Moose on a ridge between Green Lake and Blue Lake. It is a third of a mile broad and 7 miles long."

Linklater, Reeves, and Mitigwab all agree that Moose will not necessarily, go half a mile from one place all summer; many spend their entire life within a 10-mile tract. But when chased in winter, they will travel 15 or 20 miles, and not return to the same place all winter afterward (unlike Deer).

While the Wolf and Fox may greatly extend their home range in winter time, the Moose and some others seem to restrict themselves to a smaller locality then than in summer—no doubt on account of the difficulty of travelling in the snow.

In the winter, according to all testimony, the Moose is satisfied with so small a range that it is called the winter-yard. This may be less even than 50 acres. Indeed, George H. Measham writes me from Manitoba, that he has known a family of 4 Moose to pass all winter within a radius of 300 feet. Having found a suitable place to yard, a family will stay there until the snow is gone, the food fails, or they are driven out by hunters. I should think that ordinarily a Moose, especially a cow, passes its life within 10 miles of the spot where it was born.

"Like the Whitetail," says Shiras, "the Moose often remains within a very limited area, both in winter and summer, if undisturbed. But, unlike the former, when frightened, instead of returning within 24 hours to their old locality, they leave for an indefinite period, and often never come back."[37]

Although the species has no orderly migration, so far as known, there is evidence of a migratory instinct, in the erratic wanderings of individuals, especially of the young bulls in their second and third years.

Jean L. Legare, Indian trader from Wood Mountain, told me, July 12, 1901, that "in 1892, while camped on the plains 20 miles from Moose Mountain, a young Moose came walking across the open prairie, and

[37]Personal letter.

joined our Horses as they fed. I got a gun as soon as possible, but he took alarm and trotted toward the mountain. There was no cover within 20 miles of our camp."

The Moose are subject also to a drift that will be discussed in the next chapter.

The Drift of the Moose

There is one peculiarity of the Moose range that is unique, at least among our Deer. Many observers state that Moose are *now found* in such and such a large region *where formerly they were unknown.* It has always seemed to me more likely that in these cases, Moose are *now common where formerly rare.* If Moose can live there to-day, why not in primitive times?

But the statements of many reliable travellers, among them Dr. Robert Bell, of the Canadian Geological Survey, are not to be ignored. Doubtless, there is yet a curious chapter to be written on the distribution of the species. Doctor Bell says: "The Moose or American Elk (*Alces americanus*) migrates slowly from one large area to another through periods extending over many years. For example, in the Gaspé Peninsula, the last interval between its leaving and again returning to the same district, was upward of half a century; and, in the region between the Upper Great Lakes and James Bay, the period between his last withdrawal and reappearance has been still longer."[38]

The following records are further evidence:

"A few years ago, a single Moose was shot in the Yukon delta close to the sea, which is the only record I have of its occurrence so far to the west. During the winters of 1879, 1880, and 1881 Moose were numerous from Paimut to Mission, on the lower Yukon; and the Eskimo living there killed a number of them. . . . It is possible that . . . the Moose has extended its range to the northwest within the last few decades, since the southeastern part of its range has become more and more restricted."[39]

"As to what you say about the migration of Moose, it is commonly and unanimously asserted by the Indians of Cassiar (where I hunted and got Moose) that Moose were unknown to their forefathers, and that the beast is a new-comer. He is extraordinarily plentiful there now."[40]

"It has only been within recent years that Moose ranged in the Telegraph Creek region. The first one was killed in the early '70's, and then one was only killed occasionally until 1896; at which time they became

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[38]Mammoth & Mastodon Remains, Hudson Bay, Bull. Geol. Soc. Amer., June, 1898, p. 376.

[39]Nelson, Alaska, 1887, p. 287.

[40]Clive Phillipps-Wolley, personal letter, Feb. 4, 1906.

plentiful and have increased so rapidly that Moose meat is regularly sold at Telegraph Creek for 15 cents a pound."[41]

"Moose were certainly not found on Nelson River in my early days, 40 years ago, nor at Fort Alexander, nor Lonely Lake, nor Lake Nipigon, nor any of the country west and north.[42]

"In Canada and Alaska, there are sections where this animal is not only increasing in numbers, but is also occupying a much larger range than formerly. Even in the near-by province of New Brunswick, the Moose within the memory of the present generation has occupied new territory. It has also crossed the height of land in northern Quebec and Ontario, and moved down towards Hudson Bay; and for the first time in history, Moose are found around Lake Mistassini, in the latitude of the south end of James Bay."[43]

George Crawford of Mattawa (Chief Mitigwab of the Algonquins) is responsible for the following: "Moose were unknown at Temiscaming 35 years ago; now abundant there, and on to Hudson Bay."[44]

"When I first visited Lake Superior in 1870," writes George Shiras 3rd, "Moose were practically unknown on the southern or northern shores of this lake; and the same was true of a large area north of Lake Huron, for the larger portion of Western Ontario was occupied only by the Caribou. Now Moose are present by thousands in the country north of these two great lakes, and to the western end of Ontario. . . .

"Another remarkable increase of Moose is found farther north, where they have taken possession of much of the wooded winter range of the Barren-ground Caribou. They have occupied the valley of the Mackenzie River, from its source to its mouth, besides new ground east and west of James Bay. In British Columbia, the Yukon, and much of Alaska, there is also a steady increase."[45]

In Minnesota, according to C. E. Johnson, "in 1915 alone, during a period of about 9 weeks, 132 Moose were seen, and trails and wallows were abundant about the water courses. I did not visit the region again until the summer of 1920, when, to my surprise and disappointment, I met with a total of only 5 Moose from July 26 to Sept 4. Signs seemed to indicate that the bulk of the Moose population had deserted the territory."[46]

Finally, an important article on the subject is supplied by R. M.

[41]Henry Bannon, Forest & Stream, May, 1918, p. 273.
[42]George Linklater, H. B. Co., guide, personal testimony, Sept. 17, 1905.
[43]Editor, Am. Game Prot. Assn., May, 1919, p. 37.
[44]Deux Rivières, Que., Sept. 10, 1905.
[45]Forest & Stream, June, 1921, p. 284.
[46]Mamm. Minn., Journ. Mamm., Feb., 1922, p. 35.

Anderson of Ottawa. It appears in the *Canadian Field Naturalist* for Feb., 1924, pp. 27–29. From this I make the following extracts:

"Mr. Joseph Hodgson, a retired Hudson's Bay Company factor, who was for many years in charge of posts at Rampart House, Fort McPherson, Fort Norman, and other far northern points, told me that up to about 60 years ago, Moose were very rarely seen east of the lower Mackenzie; and that up to about 1905, Moose were virtually unknown on the east side of Great Bear Lake. In 1911 we found Moose to be not rare on the Dease River, northeast of Great Bear Lake, and the Indians reported that Moose were fairly numerous on the great peninsula between Dease Bay and McTavish Bay known locally as Caribou Point.

"Mr. D'Arcy Arden, a well-known trapper and trader of that region, told me in May, 1916, that the Indians shot 5 Moose on Caribou Point, and 3 on Dease River during the winter of 1915–16.

"While the Moose are not very common at the edge of the scantily forested region, and very rarely venture out on the Barren Grounds, a Copper Eskimo told us that he had seen 2 Moose near the mouth of Rae River, west end of Coronation Gulf, in 1909 or 1910.

. . . . . .

"Farther east, Mr. E. T. Blundell, in a letter dated Feb. 2, 1920, from Island Lake Post, via West Selkirk and Norway House, Manitoba, writes:

"'I have made frequent enquiries of the Indians regarding Moose and Deer; and find that 40 years ago, or thereabouts, Moose were unknown in this region [northeastern Manitoba]. Since then they have gradually appeared in increasing numbers and in some of the places more remote from the main lake, are in fair numbers (mostly to the southeast, a better feeding country.)' . . .

. . . . . .

"An interesting record of the occurrence of the Moose in the region northwest of Hudson Bay, was given to Dr. M. O. Malte by Inspector E. G. Frère, Royal Canadian Mounted Police, Nov. 27, 1923:

. . . . . .

"'Two Moose were shot at about 40 or 50 miles southwest of the Police detachment which is situated on south shore opposite Fairway Island at the mouth of the [Chesterfield] Inlet. Moreover, they were not both shot at the same time, but some weeks passed in between. I believe the first was shot in January, and the other in February, 1923.'"

Why Drift?

What is the explanation of these wholesale and definite movements? They are not of the nature of migrations, but rather are emigrations; and are not without parallel. Beaver, Possum, White Fox, Redfox, White-tailed Deer, and others are known to make similar changes of homeland; and in every case, the chief motive has apparently been the search for better food.

In a small lake on my homeland, the yellow lilies or spatterdocks were overabundant. To get rid of them, I mowed the leaves off as near the root as possible, using a scythe over the stern of a boat. After the first mowing, a second crop of leaves appeared in a month. But after the third mowing, no more came up, and the roots died, I suppose, of suffocation; the bed was destroyed.

In this, we may find one reason for the drift of the Moose. Many guides have assured me that lily-pads are an essential of Moose diet. By overcropping the pads in a given region, the Moose have killed the lily beds. Such an occurrence in a wide area, might easily send the whole Moose population on to another region, till the lily beds had time to recuperate.

Deforestation is an important agent, especially when in the form of big forest fires. Referring to Western Ontario Moose, George Shiras 3rd says: "This increase would have been impossible, were it not that the food conditions have been improved ten-fold in the past 50 years by cutting down the pine, and by forest fires; followed by a second growth of poplar, cherry, birch, beech, maple and mountain ash, besides ground vegetation."[47]

Charles W. Bates, of St. Felicien, P. Q., traces the increase of Moose about Lake Clair, P. Q., to the escape of that region from forest fires which prevailed in the country around.[48]

The reverse effect is ascribed to forest fires by Henry Bannon, who, in explaining the increase of Moose on Telegraph Creek, says: "There are two causes for the entrance of the Moose into this territory. One is that the increase from the Moose to the north must find a new range, or the feed in that range would become scarce. In doing so, they have moved into this territory.

"The other reason, and it is related to the first, is that several years ago, an Indian set out a forest fire that consumed much timber. Willow brush took the place of the timber, and this brush is the principal winter

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[47]Forest & Stream, June, 1921, p. 284.

[48]Can. Forest & Outdoors, Sept., 1924, p. 506.

PLATE XXVIII.—MOOSE GRAZING

(From photograph by Jenness Richardson)

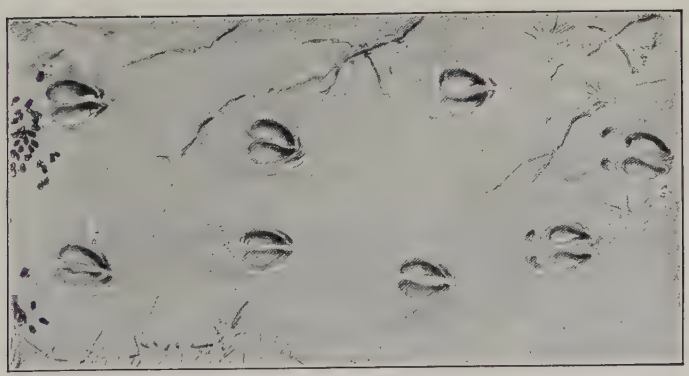

PLATE XXIX.—BULL AND COW MOOSE TRACKS IN ABOUT ONE INCH OF SNOW

The bull tracks (A and C) are 5x6 inches; the strides vary from 2 feet to 5 feet. The softer ground and deeper snow cause the toes to spread and the hind hoofs to show

The cow track (B) is 4 x $5\frac{1}{2}$ inches, and is distinguished by its smaller size and slenderer form

PLATE XXXV.—MOOSE BATHING
From photograph by Fred C. Walcott

PLATE XXXVI.—YOUNG MOOSE IN ST. LOUIS ZOO

food of the Moose. They naturally came to the range where their food could be found."[49]

It is possible also that certain regions become infested with Moose ticks and gad-flies, so that the Moose are compelled to move out or die.

Andrew J. Stone contends that the dying-out or shifting of certain Indian tribes is the chief factor in the problem.[50]

Haunts

Though essentially a creature of swamps and thick woods, the following is given by Dr. W. H. Osgood in discussing the Alaska Moose: "In the mountains, their tracks are so numerous on high rocky ridges above timber line, that such places may well be regarded as a part of their regular range. But most of their time is spent in the mixed woods of spruce, poplar, and birch at moderate elevations, or on the flats along the river bottoms where dense growths of spruce alternate with openings containing small ponds and grassy swamps bordered by thickets of willow and alder. The latter places are mostly sought during the season of flies and mosquitoes, to escape which the animals often lie for hours partly submerged in shallow ponds."[51]

Primitive Numbers

Writing of Grand Manitoulin Island, Lake Huron, in the winter of 1670–71, Nicolas Perrot states that 2,400 Moose were snared.[52] The island is 1,600 square miles in extent. There is no reason to suppose that the Moose taken were a larger proportion than in any other hunt, which means not a quarter of their number. This might give about 10,000 Moose on the island, or more than 6 to the square mile.

Those who know the Moose range will believe this was an unusually high rate of population. Yet, "We were informed," says Mr. Robert Bell,[53] "that a party of hunters had procured 300 skins in 1857; and that another party of only 3 Indians had killed, during the same season, between 90 and 100 on one expedition, as many as 6 falling a prey to them in one day, yet these noble animals roam in numbers over the district."[54]

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[49]Forest & Stream, May, 1918, p. 273.
[50]The Deer Family, 1903, p. 302.
[51]Game Resources of Alaska, Yearbook Dept. Agri. for 1907, p. 472.
[52]Memoire, 1864, p. 126.
[53]Geol. Surv., of Canada.
[54]Quoted by Hind, Expl. Lab., 1863, I, p. 126.

On Caughnawanna Reserve, Que., 10,000 square miles, George Crawford, the guide, told me that he and his associates estimated the Moose at 5,000, one to each 2 square miles; but they are more abundant now (1905) than 6 years ago.

During a stay of 9 weeks in the Kawishiwi River district of Minnesota, C. E. Johnson saw 132 Moose.[55]

Grand Island, Lake Superior, with its 13,600 acres, had, in 1912, according to George Shiras 3rd, 30 Moose, besides 250 Elk, and 3,000 Deer, a dozen Caribou, some Mule-deer, and a few Antelope. It was far overpopulated, for the Moose, the Elk, and half the Deer died of starvation. There are now about 30 Moose, a dozen Elk, and perhaps 1,000 Deer.

On Kenai Peninsula, about 10,000 square miles, George Nelson, guide from Skilak Lake near Seward, Alaska, estimated the Moose in 1925 at 20,000.[56] About one half of it is Moose range, so that the rate of population might be 4 to the square mile.

This must be near a maximum rate, for in the summer of 1917, George Shiras 3rd visited the wooded island of St. Ignace in Lake Superior. It contained 20,000 acres (about 30 square miles), and an estimated population of 300 Moose, or 10 to the square mile. This was so overpopulated that the food supply gave out. "The succeeding winter, all the Moose, not swimming ashore or crossing on the ice, died of starvation."[57]

As sidelight, we are safe in referring to the Elk of Sweden which some consider to be of the same superspecies as our Moose. Dr. Tel J. Bergryn of Stockholm tells me that in Oct., 1890, he was present at a great Elk drive by King Oscar in honour of Kaiser Wilhelm. It took place on the Government Preserve, Hunneberg, near Trollhatten on Lake Vernern. The Preserve was an upland forest. The area covered by the beaters was about 10 by 5 miles, or less. The number of Elk killed was between 300 and 400. As a great many escaped the slaughter, it is evident that there was at least an Elk for every square mile on the Preserve. It was considered well stocked.

At the Moose's ordinary rate of increase, how long should it be in doubling its numbers? Supposing, for example, 100 Moose, equally divided in sex, to be shut up within an ample forest. Although 2 calves is the rule, they would be far from doubled at the end of the first year; for, of the 50 cows, some would go barren that year, some would lose their calves, some

[55] Journ. Mamm., Feb., 1922, p. 35.
[56] The Daily Colonist, Vancouver, B. C.
[57] American Forestry, Nov., 1923, p. 671.

would have but one, and many accidents would make a continual drain. Experience shows that under the most favourable circumstances, we could not reckon on an annual increase of more than one fifth of the herd. This would continue until the whole range was fully populated that is, until checked by the food limits; the number would double in about 5 years. Evidently, then, an annual drain of one quarter would lessen the number of Moose; but if the drain were one fifth, they might hold their own; if it were but one sixth, they would probably increase.

With these facts in view, let us take the report of G. H. Measham, an old resident of Manitoba. Writing me from Shoal Lake, northwest of Winnipeg, in 1900, he says:

"The Moose is, however, far from being scarce or in much danger of becoming extinct. I can safely state that within 50 miles of Winnipeg there are hundreds of Moose; and that within 100 miles, there are thousands of them.

"For example, in the districts of St. Laurent and Oak Point, there must be some 60 or 70 hunters. Cutting them down to 2 Moose per annum, that would mean 130 Moose killed. Now, it would be more nearly true to state the year's kill at 500 head of Deer, mostly Moose, and all killed in the municipality of Posen, the greater part in townships 21 and 22, ranges 5 and 6, west of 1st meridian. This slaughter has gone on for years, yet the Moose are still there, and lots of them. The fact is, that though there are districts (like Fisher River, Posen, Lake St. Martin, and so on) that are much hunted, yet there are vast districts that are practically untouched. The Indian hunter does not, nowadays, travel very far from his reserve; and I have reason to believe that the Moose are not only holding their own, but increasing."

The area in question is about 500 square miles. According to these figures, there is a Moose population of a round 1,000, or 2 to the square mile. This is what most hunters consider fairly good Moose country, although a rate 10 times as high is found in some localities.

Endorsement of Measham's figures is supplied by Henry Alloway, of Winnipeg. He is an old resident of Manitoba, and knows every part of the Province. He estimates that 10,000 Moose are killed here every year. He knows one man who killed 80 last year (1906). Manitoba, at that time, was about 70,000 square miles, of which 60,000 was Moose country. The above annual toll implies at least a Moose to every square mile.

The entire range of the Moose is about 3,500,000 square miles, but it is not all equally good; at a very rough estimate, we may put the number on the whole range at a round 1,000,000 of Moose.

Numbers To-day

In Nova Scotia, according to the Game Commission Reports, the lawful kill of bull Moose in the years 1910, 1911, and 1912 was 509, 617, and 678. This quite certainly indicates a total kill of 700 or 800. Yet the Report says that "on the whole, the Moose are increasing in numbers."[58] Therefore, the kill is less than one fifth, giving as a probable total 4,000 Moose in Nova Scotia.

In 1913, the editor of *Forest & Stream* calculated the annual kill of Moose in New Brunswick at 2,400, and the total population 10,000.[59]

Dr. T. S. Palmer makes the following estimate of the Moose in the eastern range: "In Maine, Moose are confined to the northern and eastern sections, and probably not more than half the State can properly be considered Moose country. In New Brunswick, they are found in all the counties, and in Nova Scotia are hunted in all sections except on Cape Breton Island, where they have been protected for a number of years. This gives an area of about 16,500 square miles of Moose territory in Maine, 28,000 in New Brunswick, and 18,300 in Nova Scotia, or a total of 62,800 square miles, a little less than the area of New England. In this region, nearly 3,000 Moose were recorded as killed that season. As each hunter is limited to a single Moose, this indicates that more than 3,000 persons hunted Moose, and on the average one Moose was obtained on every 20 square miles."[60]

In spite of this drain, the Moose do not decrease. Therefore, there must be at least a Moose to every 4 square miles, a low rate of population.

When in Glacier Park, Mont., in Sept., 1916, I used all means to get an estimate on the Moose population. The guides agreed that on the west side of the Park, there were 150 to 200.

"Through the courtesy of Hon. George Shiras 3rd, who has made a personal study of the Moose in the Yellowstone National Park region, during the past two [five] seasons, the following estimates have been furnished regarding the number of Moose in this general region. In the Yellowstone National Park, 1,550; in Wyoming, 500; in northwestern Montana, 500; and in Idaho, 500. Total, 3,050."[61]

Harold McCracken, writing of "The Game Situation in Alaska," says:[62]

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[58] P. 8.

[59] Forest & Stream, July 25, 1914, p. 130.

[60] Game as a National Resource, Bull. Dept. Agri., No. 1049, 1922, p. 5.

[61] Progress of Game Protection in 1910, by T. S. Palmer and Henry Oldys, U. S. Dept. Agri., pub. June 29, 1911, p. 11.

[62] American Forests, June, 1924, p. 362.

"My last trip into the Moose region of Kenai was during September and October of 1922, and on that trip, I personally saw on one occasion in the neighbourhood of 60 Moose, all in view at the same time. There was not a single day while in the back country, that I did not see at least 8 or 10 Moose."

In Canada generally and in Alaska, nearly primitive conditions prevail.

Antlers

The antlers' size and shape have even less relation to the age of the animal than with the Wapiti. After the third year, no one can tell the age by the antlers.

The young bull Moose grows his first pair—two snags a few inches long—in his second summer, shedding them the following spring. Next year he grows his prongs, shedding them late the following winter or in spring. The third pair have a beginning of palmation. Thenceforth, each pair is more palmated, and is dropped earlier—usually in January or February; but bulls of exceptional vigour drop their antlers as early as December. As with most male Deer, the full development of the horns is attained about the 7th or 8th year; then comes a period of little change, followed, after 3 or 4 years, by a decline.

After the Moose has grown old, or passed his vigour, the palmation becomes wider, and the points shorter, until, in very old but still vigorous specimens, the upper part of the antler is merely scalloped along the edge. The Moose killed by Mrs. Seton, as related in "Measurements," had the long brow tines displaced by a palmation that joined, as shown, with the main web. This individual was past his prime, but still lusty. He had several battle scars on his shoulders, and his right ear was badly torn by some recent encounter.

The guides on the Ottawa claim that Moose are right- and left-handed. A right-handed Moose lies on his right side, and the effect on his growing horns is very marked, giving that one a twist.

Record Antlers for Eastern Canada

The widest pair accredited to New Brunswick was taken by L. Russell, a resident hunter of the North Shore district. The spread was "exactly 72 inches." The Moose was killed on the headwaters of the Nepisiguit in 1917.

George A. Boardman is responsible for the statement that Andrew

Downes of Halifax, N. S., had a 72-inch pair that were presented to the Prince of Wales during his visit in 1865.[63]

R. D. Fetherston of Vancouver, B. C., claims for his friend, D. G. MacDonald, the record Moose head taken in Quebec. This was secured in the fall of 1889 on the Magnisippi River. Spread, 71½ in.; points, 32; width of palmations, 20 in.; girth around burr, 15 in.[64]

In the autumn of 1910, Oliver Spanner, the well-known taxidermist of Toronto, secured a 71-in. pair of Moose horns. They were shot in the Temagami Forest Reserve, a few miles from Bear Island, Ont.[65]

On Oct. 10, 1906, Lewis M. Gibb, of New York, secured in Caughnawana Club Preserve, Pontiac Co., Que., a 70-in. head.

For long, the record-bearer for spread among antlers of the Canadian Moose was the 68¼-in. pair taken by Dr. W. L. Munro of Providence, R. I., on the Nepisiquit, N. B., Oct. 12, 1907. (This and all of the foregoing are owners' measurements.)

The previous record pair were those taken by F. H. Cook of Leominster, Mass., in New Brunswick, Oct., 1898. These, as measured by S. L. Crosby, of Bangor, at the time of capture, were 67 in. from tip to tip. During the intervening 8 years, they have shrunk a little, by inevitable drying, and to-day are only 65¼ in. across. They now hang in the Leominster Club, at Leominster, Mass., where I examined and measured them (see Plate). This pair has first place in Rowland Ward's Records of Big Game (1922 ed.) among Eastern Moose. Ward is responsible for the measurements.

Next comes a 66-in. pair,[66] also from New Brunswick, now in the collection of Stephen Decatur, of Portsmouth, N. H.

The Bierstadt head killed in New Brunswick, in 1880, is a marvel of palmation and size. Its spread is 64¼ in.[67]

Minnesota follows closely with a 64-in. head killed by H. C. Percival, of Mine Centre, Ont., in St. Louis County, Minn.[68] These are singularly symmetrical, even to the pendant on the under side of each (see Plate).

A pair taken 90 miles northeast of Winnipeg by H. C. Pierce, of St. Louis, Mo.,[69] though only 56-in. spread, represent, to my mind, the most beautiful type of Moose antler. They have broad curving shovels behind, and a bold sweep of many-serried and even points in the brow clusters; it

[63]Forest & Stream, June 15, 1895, p. 486.
[64]Recreation, Sept., 1898, p. 226.
[65]E. Tinsley, Forest & Stream, June 10, 1911, p. 897.
[66]R. Ward's Records of Big Game, 1922, p. 90.
[67]Moose, Madison Grant, 7th Ann. Rep. N. Y. S., F. F. G. Comm., 1903, p. 232.
[68]Recreation, May, 1899, p. 357.
[69]Forest & Stream, Nov. 30, 1895, p. 465.

is a question whether, with due allowance for points of merit, they do not rank first among those of Canadian Moose.

Except the Leominster head, I have not personally examined any of these.

Rowland Ward lists 9 sets of eastern Moose that are 60 in. or more in spread (1922 ed.)

Alaskan Antler Records

But the Alaskan and Cassiar Moose form a class by themselves. The world's record is the great Alaskan head now in the Field Museum, where I saw and measured it. These measure 77½ in. across the widest part, and with the dry skull weighed 91 lbs. Prof. D. G. Elliott informed me that, when first shot, the hunter measured them at 84 in. across (see Plate).

C. Phillipps-Wolley writes me that there is in the Union Club, Victoria, B. C., a 76-in. head killed near Cook's Inlet, by A. S. Reed.

In view of the fact that weight, ruggedness, symmetry, and number of points are to be considered, the following are formidable competitors for the first place: a 74¼-in. head in the Chicago Academy of Sciences;[70] the 73¼-in. head belonging to the Duke of Westminster;[71] the 72-in. head in the Union Club, Victoria, B. C. (Phillipps-Wolley); the 70¼-in. head in the collection of W. W. Hart, of New York;[72] and the 69-in. head killed by Dall de Weese, September, 1897.[73]

Rowland Ward lists 14 sets of Alaskan Moose that spread 70 in. or more.

Freak Antlers

Such remarkable growths are, of course, liable to great variation. Freak horns are common among Moose, and some of the most curious are illustrated in the Plate, all on the same scale.

Some 20 years ago, E. W. Darbey of Winnipeg, showed me a Moose head with 3 distinct antlers. And W. J. Tweedell, of Woonona, Man., tells me that he saw a one-horned Moose killed near Lake Manitoba by Chief Metwayash.

R. P. Allen, of Fredericton, N. B., says: "The Moose was shot by Charles Lee of St. George, N. B., on November 17th, and weighed when dressed 700 pounds. The fact that the head of the Moose was decorated with a double set of antlers, perfect in shape, created a great deal of com-

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[70]Forest & Stream, Dec. 24, 1898, p. 508.

[71]Lydekker, Deer of All Lands, 1898, p. 53.

[72]Forest & Stream, Jan. 23, 1897, p. 65; also Jan. 30, p. 85.

[73]Recreation, Feb., 1898, p. 151.

ment, and there were a number who expressed the opinion that it had failed to shed its antlers during the previous year. A close examination of the head, however, showed that the horns had sprung from the same root, but had branched off at the base."[74]

Cow Moose with Horns

On Feb. 14, 1901, E. J. Murch of Bangor, Me., showed me the head of a cow Moose that had but one horn, and that in velvet. She was shot about Oct. 25, 1900. In her, was a fawn that would in due course have been dropped early in December.

If there is no error in these observations, they point to a derangement of the sexual system that is worthy of a full investigation.

George L. Bull writes that, when hunting on the Yukon "in July, 1900, I shot a cow with antlers, mistaking her for a bull. On going up to her, I started her calf, which had just finished her lunch of milk. The antlers, of course, were in the velvet and only about 8 inches long."[75]

Locked Antlers

The locked horns, so common among Wapiti, Caribou, Whitetail, and Blacktail Deer, are also found among Moose. One may wonder how these big, flat shovels can become entangled; and yet they do.

There are several cases on record, the most wonderful being the antlers of a pair of giants from Alaska. These I saw in Sheard's establishment in Tacoma. The man who found them, brought them out at great cost. He thought he had a wonderful prize, yet Sheard remarked: "I will give half as much more to any one who will unlock these antlers without using a saw. As they stand, they are an unwieldy curiosity which no man wishes to buy, but separated, each will make a fine trophy."

The Death of the Antler

The antlers of the bull Moose are developed for battle with his own kind. As soon as the rut is over, they are of little use; and Nature, true to her principle of economy, proceeds to get rid of them. The useless lumber is dropped in the depth of winter for, notwithstanding the voice of the people (which is said to be the voice of God), they are *not* used for shovelling snow. As the hunters say, when the sap begins to flow in the trees, the sap begins to run in the antlers of the Moose. They sprout afresh in April; earlier if the Moose be very vigorous; later if he be a weakling. Yet he has not been

[74]Forest & Stream, Feb., 1926, p. 99.
[75]Recreation, June, 1902, p. 463.

Moose antlers, showing successive growths

1. Appearance on the calf under a year old. 2. At eighteen months. 3. At two and one-half years. 4. At three and one-half years. After this the brow points increase to two or three in number on each side; the webs or palms grow wider and the points more numerous for five or six years.

These drawings were made from specimens whose age was not positively ascertained, and are offered with much hesitancy.

The 68¼-inch New Brunswick Moose, taken by Dr. W. L. Munro, of Providence, R. I., Oct. 12, 1907

Diagram of Moose bell, from old bull in about tenth year

Dewlap 12 inches long about half an inch thick, and 3½ inches deep

Bell of same thickness and character but 8 inches long

Cow Moose bell, 38 inches long

From photograph by E. W. Darbey

Specimen taken in Manitoba, 1903

Unusual bell, 18 inches long exclusive of hair. Shot near Birnie, Manitoba

PLATE XXX.—DETAILS OF MOOSE

by any means disarmed; for his mighty forefeet, armed each with a pair of stubby bayonets of horn, are ample protection against any Wolf or Bear that might dare to assail him or the family in his care.

In three months, the antlers are finished and the velvet begins to shed off, showing the white, bony structure beneath. By September, the antlers are sunburnt to a deep brown, except the tips, which are white and polished from being rubbed on the brush and trees.

What becomes of the shed Moose horns? "Moose Shank" offers a helpful paragraph. Writing from Cumberland Co., Nova Scotia, he says: "Last winter, I found a set of antlers dropped a short time before, and this fall being in the same locality, I had the curiosity to see what had become of the horns. After a good deal of search, at last I found a piece of bone from next the skull about the size of a goose-egg, and about the same shape. On examining the surroundings, I soon discovered that the Squirrels and Porcupines had regular roads to the horn, from which they had had many a good meal. This is why it is that although thousands of sets of horns have been dropped in past years, there are so few found."[76]

Even when hung in a tree, the process of disintegration is rapid, as illustrated in the Plate.

The Indians told L. L. Dyche that Moose bury their fallen horns. They "paw moss, dirt, sticks, and snow on horns," which accounts for their rarity.[77]

A still more curious possibility is alluded to in the following on "Animal Cemeteries," by G. de Montauban, of Quebec. Referring to the widespread idea that Deer seek some definite place at which they shed their antlers, he says:

"The efficient superintendent of game and fisheries at Quebec, L. Z. Joncas, Esq., has told me that they do frequent such places, and that this habit was quite well known to him. He knew of many (and mentioned several) places where horns could almost certainly be found at any time. And not only do they go to shed their horns, but they go there to die. These places are known as cemeteries, and whole skeletons are occasionally found."

Joncas instanced the case of a man who wanted a pair of Moose horns in the close season. "He was told that by diverging a little from his route, he might reach a place where he would find plenty of them. He did so, and secured five excellent specimens."[78]

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[76]Forest & Stream, April 3, 1897, p. 265.

[77]Campfires of a Naturalist, Edwords, 1893, p. 273.

[78]Forest & Stream, May 27, 1899, p. 404.

In the Woodland Caribou Life will be found evidence that at shedding time, the Caribou spend much time on the ice of the small lakes, so that the bottoms of these lakes are littered with shed antlers, and look like a cemetery.

Signs and Sounds

How are we to know that there are Moose in a swamp since they rarely give us a chance to see them?

The sure, certain, lasting sign is the "fumet" or dung-balls. These resemble in character those of other large Deer, but their size is distinctive.

Another important sign is the track. "Like the track of a cow, but sharper," is the earliest description I ever heard of it. This sign is soon changed by weather, and tells the observer how much time has elapsed since the Moose was here.

While feeding in winter, the Moose will chisel the bark off saplings with its front teeth, as indeed do most Deer; but the size of the mark and the height from the ground will usually tell if such a mark was made by a Moose. It is often remarked that only one side of the bark is thus taken, and therefore the tree survives.

The nipping of twigs also at a great height is an important Moose sign.

Other telltale marks are the scrapings of the trees with the antlers, and the deliberate crossing of bogs. In this last respect, the Moose is second only to the Caribou. An important sign in fall is the wallow, fully described later.

Apart from the various uncatalogued and uncomprehended roars, bellows, grunts, and whines of the mating season, the Moose has many other vocal expressions that serve to tell the neighbours how he feels, or what he is thinking about. A number of young Moose that I have been among, and handled, uttered a soft whinnying sound when begging for bread. They proved their training by nosing in the neighbourhood of my pocket as they squealed. Again, the cow and the calf call to each other in a variety of soft whines.

Food

The food of the Moose is browse, twigs, and leaves of many hardwoods, their particular favourite being moosewood or striped maple. Yet they do eat grass, as I have many times witnessed.

The big Moose killed by my wife in Quebec, Sept. 25, 1905, had its paunch half filled with grass.

They do not always kneel for it, as is stated; but often eat like a Horse, merely bending their necks if the grass is high, or adopting an inelegant giraffe-like straddle if it be low (see Plate).

Although they feed chiefly on twigs and bark in winter, I observed that about Carberry, they devoured quantities of equisetum, or joint-grass, which sticks up through the snow.

"Moose rise and feed at dawn," says J. G. Lockhart. "About sunrise, they again lie down to chew the cud or sleep till 10 or 11 o'clock. Then they feed till 2 o'clock in the afternoon; again lie down till 4 or 5 o'clock; then feed till dusk, when they lie down for the night."[79]

Commenting on this, George Shiras 3rd writes me: "In my flashlight work, I found that the Moose were active from dusk until about 11 o'clock at night. These animals, when they come to the water for aquatic plants, usually poked around for two or three hours, and by midnight were ready to retire, whereas the Whitetail goes and comes at all hours of the night."

James E. Powell, the Moose expert, says that "the favourite food of the Moose is the twigs of the fir tree and the bark of the mountain ash, and of a species of dwarf maple, and the young twigs of the moosewood."[80]

In the summer, the favourite food of the Moose is the lily-pads and lily-roots. In pursuit of these, the whole Moose population seems to gather along the rivers and ponds. Here they feast; and at the same time, are so much in the water and in the wind, that they experience much relief from the pest of mosquitoes.

In feeding on the lilies—pads and roots—the Moose develops a surprising amount of subaquatic talent. According to Frank H. Risteen of New Brunswick, his friend, Henry Braithwaite, the well-known woodsman, "spent a great deal of time watching their aquatic operations, and is prepared to affirm by actual timing that a Moose frequently remains under water for as much as a minute and a half. Moreover, he says that the animal, when feeding in deep water, can sink or rise at will. He had one experience this spring that for a time rather upset his equanimity. He was quietly paddling his canoe around a turn in a dead water. There was not a ripple on the water. Suddenly a huge form broke the surface a few yards in front of the canoe, took in a breath of fresh air, and went down again. When the Moose came up the second time, Henry had passed the point where he first appeared. The Moose on this occasion caught sight of him, and made for the shore at his utmost speed."[81]

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[79]Habits, p. 308.

[80]Quoted by Hind, Expl. Lab., I, p. 126.

[81]Forest & Stream, July 29, 1899, p. 87.

In winter, the Moose gather in small herds of 5 to 25; and, having found a sheltered part of the woods where willow, birch, poplar, moosewood, grass, equisetum, and pea-vine abound, will settle down there; not moving half a mile away until the food supply is eaten out.

The deeper the snow, the more marked are the many intersecting pathways made; and the area so marked is known as the "Moose yard," discussed elsewhere.

His Enemies

The enemies of the Moose are, in order of danger: man, mosquitoes, deer-flies, ticks, disease, deep snow, Wolves, Bears, and Cougars. Without doubt, man should stand first, since pump guns have come into use.

Mosquitoes are dangerous only inasmuch as they drive the Moose out of the woods into the open or into the water, where they are easily found and destroyed by man, during the summer months. So far as known, the actual drain by blood-sucking does not seriously injure the Moose.

Little is on record concerning ticks and disease, beyond the fact that Moose are subject to these.

In 1905, I dissected a prime bull Moose in the Kippewa region. His liver was full of fibroid tumours. I cut out a score for examination, but a moose-bird came while my back was turned, and swallowed the lot.

Nature, as we have seen in the Caribou Life, has two devices for offsetting deep snow: one is snowshoes, the other is stilts. These are illustrated respectively in the Lynx and the Moose. Undoubtedly, snowshoes are superior. When the snow is deep and crusted, the Lynx is even better off; but the Moose is in a sad plight. Probably it is only at such times that the adults have cause to fear the Wolves.

It is a fact that the smallest danger man has to meet in wild countries is from wild beasts. It is so small to-day that it does not count; his greatest perils are wild men, disease, hunger, and insects. The Moose is in a similar case, except that he is in no danger of starvation; and, being a stay-at-home, is less likely to get disease than is a stranger in a strange climate.

An exception to this was recently observed in the Klappan Ranges of British Columbia. Henry Bannon, discussing the game conditions there, says:

"Some Moose perished during the winter in a most unusual manner. For shelter from a severe storm, they took refuge at the head of a precipitous canyon. The snow drifted in high behind them, thereby cutting off their way out. Without food, starvation so weakened them that they succumbed to the cold."[82]

[82]Forest & Stream, Sept., 1920, p. 486.

William J. Tweedell, writing of the Moose about Lake Manitoba, says: "The warbles are a terrible pest to the Moose. I have seen the hide so full of holes as to be almost useless. The nose worms that pester the Caribou have not, to my knowledge, been found in the Moose."[83]

Moose ticks. The Chief Game Guardian of Saskatchewan makes an alarming report on the Moose ticks in his issue for 1921.[84] After general remarks on the epidemic, he adds:

"A report of unusual interest regarding this subject was forwarded by Mr. S. Lee Fraser, of Tate, who states: 'A settler in the north, Greenbush District, told me that he killed a Moose in February, 1921, and while skinning it, his knife cut open the windpipe. Noticing a dark object inside, he investigated, and found large ticks attached to the inside of the windpipe, and in the mouth. I do not believe that the ticks were the cause of any disease, but I believe that they were responsibile for the poor condition the Moose were in when the deep snows arrived last March and April, and the Moose being so weak could not forage or secure enough food to maintain themselves, and so literally starved to death.'

"I am thoroughly convinced that this is the cause for so many Moose dying. One could count as many as 10 to 20 dead Moose in an hour's walk along the small streams last spring."

The wallow may be a sanitary institution. It is discussed in the "Mating" section.

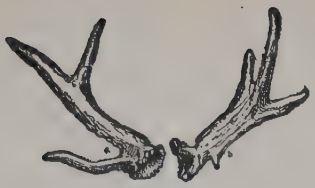
Writing of the Moose of the Upper Yellowstone during Sept., 1909, George Shiras 3rd says: "The third day up the river, I ran across the carcass of a cow Moose, killed some months before by a Lion or by Wolves. When we remember that every Deer and every Elk leaves this high altitude before November, and that the larger predaceous animals must either live upon the young Moose or get out of the country, may it not be, with the great increase of the Moose, that the Wolves and Lions have found a sufficient supply to maintain themselves during the winter without now being compelled as formerly to seek the lowlands? Twice we heard Coyotes, apparently hunting in packs, and on another occasion Timber Wolves. Just back of camp, we found the carcasses of two Elk, but could not tell by what animal they had been killed.

"With the snow more than 5 feet on the level, and all the Moose segregated into yards each winter, far away from the nearest military post or station, the conditions favour destructive raids by the Cougar and the Wolf.[85]

[83]Personal conversation.

[84]Published April 30, 1922, pp. 24–26.

[85]Forest & Stream, July 30, 1910, p. 171.



Spikes of a Maine Moose

Shed March 1, 1899, when the Moose was 22 months old. *a.* Right antler 15 inches long, 6 inches in girth above burr. *b.* Left antler 13¾ inches long, 4 inches in girth above burr. In base of each, is a cup 2 inches wide and one inch deep.

Ottawa Moose head

Showing increased webbing and reduced size of tines in a very large Moose past his prime

Collection of Mrs. Grace G. Seton (57⅞ inches spread; 26 points)

Moose from Manitoba. Prime of life

Showing three brow tines and broad palmations (49½-inch spread)

At a later period the brow tines may increase in number, but they turn smaller, shorter, and the whole antler less massive

PLATE XXXI.—ANTLERS OF MOOSE

The Moose and the Bear

The following amazing exploit was related by Henry Braithwaite of Fredericton, N. B. It took place on the Miramichi in Dec., 1898.

Braithwaite and his friend, Billy Chestnut, were following on snowshoes a large Moose track on one of the ridges near Renous Lake. There had just been a thaw, and it was hard work toiling through the moist, heavy snow. Henry was ahead with an axe in his hand, Billy walking close in his wake armed with a 50–110 rifle.

"Suddenly they saw where the tracks of two Bears converged upon the trail of the Moose, evidently in hot pursuit. Soon it was made clear that the Moose had been started by the Bears, for he had taken to that famous pacing gait upon which he depends to elude his enemies. The Bears were galloping on either side of the track. In several places, they had almost captured the Moose, as indicated by bunches of hair and a few drops of blood visible on the snowy trail.

"Henry and Billy made the best time possible on their snowshoes, and followed the tracks till they came to the shore of Moose Pond. Here the tracks gave evidence of a remarkable change of scene. The Moose had evidently been joined by another bull larger than himself that had been feeding in a swale of whitewoods near at hand, and the two had turned and faced the Bears, driving them into a thick growth of firs at the lower end of the lake.

"The two Moose had then leisurely crossed the lake, and reached a knoll of poplars about half a mile away. Here the Moose had filled in the time by having a fierce fight with each other. Hair and blood were scattered around, bushes torn up and the snow trampled over the whole top of the knoll by the furious animals. The big bull seemed to have got the worst of it, as his flying leaps down the slope plainly showed, while his victorious rival had calmly walked off in a different direction

"Henry and Billy concluded to follow the smaller bull, as he was heading for a more open country. They had not gone 20 rods before another exciting chapter was found written upon the snow. The Bears had circled the foot of the lake and were again in close pursuit of the little bull. The latter had showed fight when his foes reappeared, but took to his heels when he found he was being flanked. It looked as though his fight with the big bull had greatly weakened him, for he had fallen twice in his struggling flight. The Bears, however, could not have been in much better shape, as they floundered through the deep snow on the open ground.

"The chase now led along the summit of a sort of hogsback, or narrow

ridge, where a forest fire had levelled every tree except a few dead hemlocks.

"Suddenly the old trapper who was a few paces ahead, stopped in his dog trot, and pointed mutely with his axe handle to the top of one of these rampikes. Here was perched one of the Bears, his tongue out about a foot, and his black coat steaming with the exercise he had had. Near the foot of the rampike was the other Bear in a dying condition from a horn-thrust he had received in the abdomen. For several rods around were the marks of a most obstinate battle. Henry at first was greatly puzzled.

"'Well,' he said, 'I've travelled these woods now for about 40 years, and this beats me.'

"Stooping to examine the tracks closely, he soon unravelled the mystery. The big Moose had again joined the little one, and they had fought a pitched battle with the Bears, placing one *hors de combat*, and driving the other up the tree. Billy brought the second Bear down out of the tree with a well-directed shot.

"It would now have been an easy matter for the hunters to follow the tired Moose and bag both of them, but Henry wouldn't think of it. He was proud of the Moose for the gallant fight they had made.

"'Kill them Moose? Not if they had horns on as wide as the Miramichi River. If I could overhaul them Moose, I'd give 'em a feed of oats!'"[86]

A Gift of Manitou

In all the vast region that is tinted on my map, the moose is, or was, the Indians' staff of life. What the Buffalo was to the Plains, the Whitetail Deer to the Southern woods, and the Caribou to the Barrens, the Moose is to this great Northern belt of swamp and timberland. It stands for ever between man and the great, inaccessible world of crude plant nutrients, transmuting them into terms of human food.

It is the creature that enables the native to live. Assisted in warm weather by various fish, it bears practically the burden of their support. Its delicious steaks are their staple food, but its nose or muffle is a delicacy. Its hide furnishes the best clothing and moccasin leather, or provides snowshoes that enable the hunter to kill more Moose. Its back sinew is the sewing thread of the country; its horns and bones make tools for cutting ice or dressing hides; its hoofs can be converted into rattles; and its coarse, bristly mane, six inches long, and white except the tips, furnishes raw material for embroidery. When dyed with native dyes, and skilfully worked into leather and birchbark, these bristles are as effective for decoration as Porcupine quills—are indeed often mistaken for them by the uninitiated.

[86] N. Y. *Sun*, Dec. 27, 1898.

As a Draught Animal

Though the old bull Moose is apt to be bad-tempered all the year, and is sure to be dangerous in the autumn, the species is blessed with a better disposition than most of the Deer family. A tame Deer is more dangerous than a wild Bear. But the Moose that has been brought up by hand is a gentle creature, and usually quite safe, except in the autumn.

George H. Measham writes me: "A neighbour of mine, Henry Stodgett of Shoal Lake, Man., had a tame Moose for a considerable time. It was very affectionate; and when called, would come like a Dog; also it was as playful as a kitten, and would, like a kitten, play with a round pebble, or croquet ball, striking it with its front feet, and running after it. It would gambol with the children, Dogs, or young Cattle. But its playful slaps were no fun for whoever got them, so were not encouraged. Eventually, it became impudent and somewhat dangerous.

"In the summer, to escape the flies, it took a notion to come into the kitchen; and would lie down on the floor sprawled all over the place, much to Mrs. Stodgett's indignation. For whacking with a broomstick, it showed utter contempt; and would only budge when it felt like it. It began, too, to develop the dangerous trait of striking in play, and Henry's children had several narrow escapes. Anyway, Henry was not sorry to pass it on in a Horse trade.

"The old fire ranger, at Gurney, Ont., north shore of Lake Superior, was another one I know of who reared a Moose. It roamed the woods in the neighbourhood of his shanty, and would come to him when called; he could pat it and rub its nose. It would not let a stranger near it, that is, within 25 yards. It was three years old at the time I saw it."[87]

I have seen a number of Moose that had been broken to harness. They are docile, easily trained, exceedingly swift, and, being natural trotters, are well suited for light travel. They are so much more tractable and valuable than Reindeer that one wonders why they have not been fully domesticated in the countries where they are indigenous; but if taken out of their native surroundings, they rarely survive long.

The Demon of Commerce

Because of his resistless power which I would enlist for the saving of the Moose, I salute the demon, and will try to show that the Moose brings offerings to his altar, pays tribute at his shrine.

According to the editor of *Canadian Forest & Outdoors*, Oct., 1923,

[87] Personal letter.

p. 632: "Last year there were approximately 10,000 Moose killed in Canada. For every Moose killed, there were at least two licenses taken out, at $40 apiece. At least half of Canada's Moose hunters were visitors from the other side of the international border. Thus in licenses alone, visiting hunters must have left nearly half a million dollars in the Dominion.

"It is estimated that the average visiting hunter remains in the Dominion for ten days, and spends about $10 a day, or $100 for his expedition—and a Moose head is cheap at the price. This would add another $1,000,000 to the revenue derived. When railroad fare, which has not been taken into consideration, is included, the tide of invading Moose hunters must have been worth something like $2,000.000 to Canada last year."

Moose Marriage

At one time, it was widely believed that the Moose was nearly, if not truly, monogamous.

There are four degrees of monogamy among animals:

1st. That in which a male and a female remain together for perhaps a week; after which the female no longer desires a mate, and the male seeks a second. That is, one mate at a time, but perhaps five or six in the season.

2d. That of certain Weasels, wherein the pair continue together during the mating season of a week or more, then separate completely.

3d. That, of hawks, in which the pair continue together with little interruption, until the young are able to care for themselves (say for four or five months), the father faithfully helping in caring for the young.

4th. That of eagles, which pair and live together continuously, till one is removed by death.

The first was long supposed to be the way of the Moose—one mate at a time, but maybe five or six in the season. Some of the evidence of this is as follows: Until recently, there was no record of a bull Moose with *a herd* of cow Moose in the mating season. No man had ever seen two adult Moose dwelling together in the mating season, unless they were male and female. A Moose that is mated, will not reply to a calling cow, call she never so tenderly. O exemplary Moose!

All observers agree that the Scandinavian Moose is monogamous; which is strong side evidence, since the species is so closely related to our own. Finally, Judge Caton, the leading authority on American Deer, backed by most of the hunters I have consulted, says that the American Moose "are more strictly monogamic in their habits than any other of our Deer."[88]

[88]Ant. & Deer, p. 75.

W. J. Tweedell, of Manitoba, an experienced Moose hunter, believes that the same pair will seek each other out on successive seasons, although separated for half the year.

On the other hand, most of the hunters in Manitoba and on the Ottawa, maintain that the bull roves from one cow's range to another, and will mate with many in the season; though he is rarely seen with more than one cow at a time. In the Kippewa country, I was assured by several hunters that it is quite a common thing for the cow Moose to answer the cow-call while she is with her mate; and to come leading him, as though she desired to share her position with another. In the few cases of calling that I have seen, however, it was a single roving bull that came in answer to the invitation.

Speaking of Little Nictan Lake, Nepisiquit, N. B., Dr. W. L. Munro, of Providence, R. I., says: "I have known 3 bulls to be shot there on successive mornings, all consorting with the same little brown cow."[89]

Dr. Morris J. Lewis writes me, concerning Alaskan Moose:

"Last September, I took a hunting trip into the Yukon; and had ample opportunity to study the Moose in the mating season. I am perfectly certain that your statement as to the Moose being monogamous does not apply to the Yukon Moose. For instance, I shot a bull who was with 3 cows, and another who was with 4 cows. Again, I watched for some hours from a high ridge overlooking the sparse woods of the valley below, where I could study with my binoculars the Moose in a comparatively small area of timber. I saw a bull with 8 cows. These cows would come out into the open, and then be driven back by the bull—a veritable harem."[90]

"Moose Shank," writing of Moose in Nova Scotia, says: "I struck this noble fellow's track in the morning, and never let up till dark; all of the time he was travelling up wind, and had picked up 4 cows then, and was still looking for more, with the 4 cows after him."[91]

Prof. W. F. Ganong, of Smith College, writes me: "It is, I think, the general, if not universal, belief of the New Brunswick guides that it [the Moose] is polygamous. . . .

"But far better than these suppositions is this piece of fact. In New Brunswick, the bulls have been killed in large numbers for several years past, while the cows are carefully protected. As a result, in my summer trips, I see now several cows to one bull around the lakes of an evening. I see cow after cow, and rather consider it an event when I see a bull. I think, to be very conservative, I see 3 or 4 cows at least to one bull—

[89]Personal letter, July 8, 1908.

[90]Letter, Nov. 27, 1912.

[91]Forest & Stream, April 3, 1897, p. 265.

Sixty-seven-inch Moose head from New Brunswick

Shot by F. H. Cook, of Leominster, Mass., Oct., 1898
Drawn from a photograph supplied by W. S. Chase, Esq.

Sixty-four-inch Moose head from St. Louis County, Minn.

Killed by H. C. Percival, of Mine Centre, Ont.
Drawn from *Recreation* photograph, May, 1899

Winnipeg Moose

Ideal 56-inch head; 34 points even
Killed by H. C. Pierce, of St. Louis, Nov., 1890
Drawn from photograph in *Forest & Stream*

PLATE XXXII.—REMARKABLE MOOSE ANTLERS

certainly more than that in proportion to large bulls. And yet, in July, the great majority of these cows are accompanied by calves."[92]

A summary and a weighing of the evidence seems to indicate that the Moose, like most Deer, is polygamous; and in the few cases where he led a monogamous life, it was necessity, not choice, that dictated his behaviour.

Whether the bond lasts more than one season is another question, and one of great interest; but a point which I cannot decide, for lack of evidence. The fact that the male does not accompany the female while the calf is very young, rather goes to prove that their marriage, like their puberty, lasts but a brief and burning season; after which all is forgotten or forgiven, as the case may be; and every one is ready to begin over again with a clean slate on the next autumn.

George Linklater furnishes the following interesting psychological remark: "Last summer (1904) on Caughnawanna Game Preserve, a bull Moose and a barren cow stayed together all summer. I had frequent opportunities of observing them."

The Wallow

Meanwhile, the pair that were left in possession of the swamp have been disporting themselves according to their minds. The bull Moose makes a wallow—a "soil" or "gross," it is called in the Old World. At a chosen spot in the thicket, he digs and paws the mud, and irrigates it abundantly, till it is a mud bath with every intensified odour that his physical personality can contribute. In this he wallows, and plays to his infinite satisfaction; and with results which seem to prove that it does not in the least repel the lady Moose of his choice.

I have seen this wallow or soiling pit many times in America, especially on the Ottawa.

On Sept. 27, 1905, on Caughnawanna, 40 miles north of Deux Rivières, Que., I found and photographed a fine big specimen. It smelled horrible.

All of the guides here are familiar with the wallows, and do not consider that these have special reference to the mating season. Nevertheless, T. L. Tanton, of Ottawa, describes and discusses one or two pits newly made during the latter part of September. After determining that the pit "had not been made by pawing or rolling, but that it had been made by the *body* of the Moose sliding in the mud," he offers the explanation "that these depressions are formed by Moose during copulation."[93]

[92]Letter, Jan. 28, 1906.

[93]Journ. Mamm., May, 1920, p. 143.

Copulation

It has been said that no man ever sees the copulation of the great wild beasts. This is so nearly true that any exception is worth noting.

At Caughnawanna Lake, Que., on Sept. 21, 1905, Mitigwab, my Indian guide, told me that 12 years before, a lumber foreman named La Pine, left his camp below Line Lake to shoot some meat. It was the first week of November, with the snow deep on the ground. Suddenly he saw through the balsams ahead an enormous bull Moose with antlers 12 or 14 feet from the ground. He fired at where he guessed the monster's heart to be. To his surprise, a small 3-year-old bull Moose rushed at him from the place. The man fired as fast as he could; and at the third or fourth shot, dropped the Moose about 40 feet away. Before going to camp for help to skin the meat, he went to the place where first he saw the Moose, and there lay a cow Moose dead, shot through the heart. He had chanced on them while copulating.

Spring

With the melting of the snow, the necessity for yarding ceases, and the Moose family scatters. For what reason they do so is not clear, because the young are not due to be born for two or three months yet. Perhaps like men who have been cooped up together in tight winter quarters, or in a sailing vessel, they are glad to get away from each other for a change. The bulls go to some quiet spot, where their budding antlers will have every chance to grow.

They may have travelled a dozen miles from their own range while seeking a mate in the fall; but summer finds each individual back in the very swamp and waterfront that he has long considered his home. The cows go to some familiar, secluded place, where they can nourish the unborn calf, usually, however, accompanied at a respectful distance by their young of the year before.

It is very necessary in the economy of Nature that families should break up. Inbreeding is ruinous, and many animals have developed instincts that guard against this. I have made many observations to see whether the active party in the break-up is the parent or the young. Judging by humanity, it is the young. Among human beings, the maternal feeling usually continues longer than the filial.

But in most (possible in all) the lower animals, it is the other way. The young would keep on indefinitely demanding food and comfort from the mother, if allowed. Who has not seen a cow, a mare, a Sheep, a Cat, a Dog, or a Rabbit, driving away, with harsh menace or even violence, the over-

grown young one that teases persistently for the sustenance of earlier days? The feeling that overpowers the maternal is, I think, in most cases, the renewed mating instinct that springs from physical preparations for a new family. We can find even this paralleled in mankind, by the widow or widower who realized that an already acquired family is an obstacle in the way of a new match.

The Mother and the Young

From 242 to 246 days after that wild animal orgy in the thrillsome autumn woods, the great event takes place.

Younging time is mid-May in Manitoba, yet it may cover the whole month. On the Ottawa, according to the guides, the calves come from mid-May to June 1st.

The cow Moose may still be accompanied by her calf of the last year; but the instinct to be alone, when her time comes, leads the mother to sneak away for the final scene.

"In spring," says Lockhart, "when the females are near calving, they proceed to places where they are least likely to be disturbed by Wolves, such as islands in lakes and rivers, and also in prairies and large swamps which are overflowed with water at that season; there they search for a dry spot among thick woods where they may bring forth their young."[94]

Similar testimony is offered by James E. Powell. He says: "About this time, the females go apart, seeking the most impenetrable thickets that border on or near the water, and there bring forth their young: those of three years old and upwards almost invariably producing 2. Still I have occasionally, but very rarely, seen and known 3 at a birth; those of two years old never produce more than 1."[95]

In the same vein, L. L. Dyche says the young cow Moose have 1 calf, the older and large ones 2; and the Indians claim that they have seen cows with 3.[96]

Fred Reeves, my Deux Rivières, Que., guide, told me that, for five years, he had known and watched an old gray cow on a ridge between Green Lake and Blue Lake. She had had a calf every year, but this year (1905) had two.

In 1904, according to George Linklater, he saw about 15 cows, each with one calf, but no twins at all. In 1905, he saw 1 cow with 1 calf, about a dozen with 2, and 2 barren cows.

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[94]Habits, p. 307.

[95]Quoted by Hind, Expl. Lab., I, p. 124.

[96]Campfires of a Naturalist, Edwords, p. 273.

Burt Jones's book on the Moose has five photos of Moose calves. Four out of the five show twins.

The calves are dull reddish brown, without any of the lighter spots that characterize the rest of the Deer family in America.

The Whitetail hide the fawn for weeks; the Elk and Moose, for a few days only.

The mother never goes far afield while the calves are in hiding; and at proper times (probably two or three times a day) she comes to suckle them. Often they are able to follow her on the second day, though usually it is the third day.

Lockhart says: "When the calves are very young, the mother in their defence will even attack a man. At such times, her appearance reminds one forcibly of that of a vicious Horse. She raises her head, throws back her ears upon her neck, and sniffs or blows like a Horse; then she bounds toward her enemy, striking the ground with her forefeet, her eyes glittering with rage."[97]

On June 4, 1892, at Beauséjour, in Manitoba, I saw two Moose calves that were able to run alone, and were probably a fortnight old. They stood between 30 and 36 inches at the shoulder. They were tame and gentle.

William E. Bemis sends me a picturesque instance that shows the calves' instinct for hiding. Near his summer camp in Quebec, north of Deux Rivières, his guide chanced on two Moose calves in an open place. The little things ran here and there, looking for cover; then sought a shaggy fringe of short brush, and disappeared over a low bank by a lake. There seemed to be no place for them to hide in; yet they had disappeared. A thorough search showed them to be in the water, completely submerged, except the tips of their noses. The mother was circling about in the neighbourhood, too much alarmed to come near, but frequently uttering a warning squeal that the little ones seemed to understand.

In the country north of Deux Rivières, Que., on Sept. 16, 1905, Mr. and Mrs. W. E. Bemis and their guide, Archie Miller, had a glimpse of Moose life that is worth recording. As they paddled up wind about 11 A.M., they saw a Moose family feeding in an open windfall. The mother was closely followed by her calves of the year, a black one and a grayish brown one, understood to be a male and female. One of the calves was reared on its hind feet against a tree, eating the beard moss; the mother was eating marsh grass as she stood in the water knee-deep. But the bull was present; they found him concealed in some bushes farther back. As the canoes came within a hundred yards, the bull gave a warning grunt, the cow

[97]Habits, p. 307.

turned her head, looked at the canoe, but remained feeding. Mrs. Bemis fired at the bull calf. He fell; the rest ran—bull first, cow next. The cow calf was caught in a sort of log fence, and finding she could not get out, she bawled like a barnyard cousin—*baa—baa—baa.* But the old ones ran off in different directions. The young one tried here and there, found a place where it could leap through, and trotted away after the mother.

In *Forest & Stream* for Oct., 1925 (p. 605), is a striking photograph from nature, that shows a cow Moose swimming a wide lake in British Columbia, while the calf rests with its head and forequarters on the mother's rump.

The calves continue with the mother throughout the summer. I have been unable to determine whether or not several mothers join company at this season, as with the Wapiti, admitting young males also to their select society.

When Father Comes Back

By all the rules, the young should leave the home circle when the rutting time approaches. But on Sept. 27, 1905, in the Kippewa region, my two guides reported that at Big Dam Lake, they saw a fine bull Moose followed by a calf and a cow. So it seems that the calf sticks to his mother all through the rut.

A still more interesting note is contributed by Tappan Adney, the artist. He tells me: "In my notes, I have a story, related by an old hunter with whom I lived on the Tobique, in New Brunswick, in 1896. He was telling me of the time when he first heard a Moose call to another. Though but a small boy then, he was in the woods alone. He was paddling on Sisson Branch of the Tobique, and had stopped his canoe by the bank to rest when, close at hand, he heard a low *mooh, mooh*, that he thought was a tree rubbing against another. In a moment, a calf Moose came out of the bushes followed by the cow; and while he stood gazing, a bull Moose appeared. At first, they did not notice him, but having only a little shotgun with birdshot, he was working to untie a bag containing bullets. The movement caught the bull's eye; he came toward the boy with bristling mane. Before anything happened, the cow and the calf walked away; and then the bull turned and followed them."

The Mating Craze—The Rut

This brings us to the grand change in the Moose. "In the fall, the Moose's fancy lightly turns to thoughts of love." The physiological change, called puberty in man, now sets in with the bull Moose. He is subject, in-

Field Museum Moose head from Alaska

The record-bearer; 78¾ inches across (originally said to have been 84 inches); weighs 93¼ pounds
From a photograph

Alaskan, 74½ inches (formerly 76 inches)

Taken on Kenai Peninsula by A. S. Reed. Now in Nat. Coll. Heads and Horns, N. Y.
Reckoned by points of merit may claim first place

A 73¼-inch Moose head from Alaska

In the collection of W. F. Sheard, Tacoma, Washington
From a photograph

PLATE XXXIII.—RECORD MOOSE ANTLERS

deed, to an annual puberty. At other times, he is exempt from the much mingled pleasures of the fatuous epoch, and free to mind his own business.

Early in September, the rut sets in, and continues from about Sept. 15th to Oct. 15th. Shiras writes me that the rutting period of the female Moose, as with Elk, Deer, and Caribou, is about 30 days. That of the male begins 10 days sooner and continues 5 days later than that of the female. My Kippewa guides, however, believe that the cow Moose comes in heat 2 or 3 days before the bull, and goes off a day sooner.

In the latter part of September, the craze is at raging fever heat. Then the bull is driven by an exaggeration of everything that is male in his mental, moral, and muscular make-up. He devotes all his energies to the one matter in hand; he even neglects to eat. His all-dominant object now is to find a mate.

The cow Moose does most of the calling and inviting; the bull most of the travelling at this time—a most appropriate and ancient division of labour, a modern adaptation of Troubadour days.

His summer life may have been spent on less than one hundred acres of swamp, but now the bull Moose sets forth on his travels. Every few miles, there is a sort of meeting place of the sexes—a stretch of open woods, often a hardwood ridge between swamps. To these in turn he goes, nosing the earth and the wind for helpful suggestions. Standing with ears acock at every sound that might have been made by a Moose, and at length believing it to be from one of his own race, he challenges it with a deep, long grunt or a short bellow, and approaches it rapidly, slashing the brush with his horns to impress the other fellow with the fact that this is a well-armed and fearless knight, who is coming. He circles about to try the wind from the stranger, or (if there be no wind) repeats his various calls and beatings of the brush-wood.

There are two usual answers to all this—the long ringing reply of the responsive female; or another deep grunt like his own, but varied with some guttural sounds that tell of a savage rival, who also is searching the woods with like object. In the latter case, there may be much grunting and manœuvring before they actually come together. As they approach, they often express their defiance by slashing the brush with their new-grown weapons; and, when at last they meet and close with a crash, the spread and pointed antlers are at once their bucklers and their spears.

It is rare to find a Moose horn without the dent of battle. I suppose that, without exception, every pair of full-grown Moose antlers has been in actual service "at the front"; for every bull Moose hide has scars. In these combats, the weaker generally saves himself by flight. It is but seldom that

one of the knights is killed; yet this happens occasionally. As already noted, too, the battle has sometimes had a doubly fatal termination through the locking of the horns.

Moose-calling

The Moose-calling hunter is one who, with a birchbark trumpet, imitates the bellow of the cow Moose, and tempts the bull forth into plain view for an easy shot.

Though the least sportsmanlike, it is the most popular method of pursuit, because it is the most effectual way of getting a bull Moose. Fortunately, it can be practised only for about a month, at the beginning of the season, and in exactly the right weather and surroundings. Dead calm is essential. If there be wind from the Moose to you, he cannot hear your call; if it be from you to the Moose, he smells you, and flies to far regions. In a calm, the call can be heard for miles—so far, indeed, that even if the Moose came directly and quickly, he might be an hour or more in getting to you. I once called from a hill at sunset, and learned later that friends four miles away heard me distinctly. Therefore, a Moose, with his keener hearing, might have heard it five or six miles off.

The experienced Moose caller begins very low, as there is always a possibility of a bull lurking in some near thicket. He calls not more than once in ten minutes: some think every twenty minutes often enough. This is probably so, once the response has come. The bull's answer is a deep, long grunt, varied by the snapping of branches as he plunges forward through the woods, stopping at times to thrash some bush in his course. When at length, in the last dim afterglow, the much-heralded monster heaves his bulk into view, overtopping the shrubbery like an Elephant, looming huge and black against the last streak of red light, he affords one of the most impressive sights in the animal world.

No matter how much we may be expecting his coming, it is always a thrilling surprise. We knew how big he was, yet how startlingly huge he looks! And those antlers—a heavy burden for a man—he switches about as easily as an Indian does the eagle feathers in his hair.

By softly modulated squeals, whines, and other sounds suggestive of an amorous female, a skilful caller can decoy the great beast within a few yards; and get the chance to see, shoot, or immortalize the giant, according to the mood and purpose of the party.

As Henry Braithwaite says: "There are more ways than one of calling Moose. By studying their habits, and using a little common sense, you can get many Moose you couldn't call with a horn. If possible, never call

on dry land where you can leave a scent. If a Moose is a mile away, he may come in the dark after you leave and look the ground all over; and the most singular thing is, he can come to the exact spot where you called. This has been proved to me by Moose coming and pawing up the ground where I stood. In calling from a canoe or wading in the water, a plan I have often followed is to call just before or at sundown, and if I don't get an answer I go there quietly the next morning and look the ground over and listen. I have something I can punch the water with to imitate a Moose walking, or I take a bark horn, put my hand over the small end and dip it full of water; I hold it up as high as I can, and let the water dribble through my fingers. In this way, I have got Moose that I could not get an answer from, or bring out any other way."[98]

Fred. Talcott, writing of the Moose in Roger Williams Park, tells how he imitated the bull's defiance on a call-horn not far from the park.

"At the first sound of the horn, the bull sprang to his feet, giving his answer and darting toward me, and the cow answered with the long call. I thought also the calf answered, but of this, in the excitement and noise, I could not be sure. At the second sound of the note, the bull answered again, and without an instant's hesitation, charged against the fence in the greatest fury. As he came on, his head was lowered, bringing his antlers about on a line with his shoulders.

"At other times, both day and evening, I tried to deceive him, but without success. The cow would repeatedly answer, always with a short call, quite different from the long call imitated to call the Moose of the wild woods. A number of different notes this cow used, usually in a tone that could be heard only a short distance."[99]

As this was the rutting season, it is of unusual interest; and the patriarch is to be congratulated on the loyal sympathy of his family.

Ed. E. Flint states that he found the Moose calling and coming, from the middle of September to the end of October[100]—six weeks; that is, much longer than the rut. To this I may add that in Manitoba, in 1884, I heard a Moose call as late as December 6th.

Madison Grant says that "in Nova Scotia it seems to be a well-authenticated fact that Bear have been shot by Moose-callers, the Bear, apparently sneaking up to seize the supposed cow."[101]

Accounts of moose-calling are very various and, indeed, conflicting.

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[98]Forest & Stream, Aug., 1925, pp. 471, 501.
[99]Forest & Stream, March 25, 1899, p. 224.
[100]Forest & Stream, June 1, 1895, p. 442.
[101]Moose, 7th Ann. Rep. N. Y. S., F. F. G. Com., 1903, p. 230.

One man says, "You must imitate the call of the bull to arouse the jealous wrath of the other bull"; another, "You must imitate the call of the cow to tempt the errant bull forward"; another, "It must be done with marvellous truthfulness or the bull detects the fraud"; others maintain that any kind of a noise will fetch the bull, so insane is he with wrath and desire.

Manly Hardy tells us that his trapping partner in Maine was cutting wood late one evening "when a bull Moose came to the sound of his axe. When he was quite near, Rufus retreated into the camp, and the Moose walked back and forth on the other side of the fire, grunting and slapping his lip."[102]

But many slips are possible between a response and a fair view; even though it be a perfect call and an eager bull. A puff of wind may alarm the keen-sensed monster by bearing the human taint; he may detect a false note in the voice of the siren; or he may hear another and more attractive call—that of a real cow.

Of Henry Braithwaite, it has been said that "he was the first in New Brunswick to discover that a bull Moose could be called as readily by a really skilful caller in the daytime as at night. It is a great advantage to the sportsman to have his Moose brought up in the daytime, as he can then see clearly how to shoot. Moreover, he escapes the cold and hardship incident to lying out on the barren all night under a single blanket, or sitting cramped up in a birch canoe waiting for the Moose to come.

"Braithwaite has established the further fact that Moose may be called at seasons of the year other than the rutting period, which is supposed to extend from about Sept. 15th to Oct. 15th. He has succeeded in calling up a number of bulls as late as the middle of November, and has even had them respond in May."[103]

Sometimes the bull responds to the call, and comes almost, but not quite, up to the caller. He slashes the brush, bellows, and threatens, and yet keeps at a cautious distance. Under such circumstances, the caller is tempted to go to the Moose. Against such a procedure, Edward E. Flint offers a solemn warning. He says:

"I had firmly resolved against such a risk. The father of the guide and one brother, had lost their lives in such attempts; and the preceding year, in this same locality, two sportsmen were killed by a caller whom they were approaching for a Moose. The caller in turn, mistaking them for an incoming Moose, shot. Most unfortunately, his ball passed through the neck of the first man and lodging in the head of his companion following, killed both.

[102]Forest & Stream, May 21, 1910, p. 810.
[103]N. Y. Sun, Dec. 27, 1898.

Freak head from Manitoba, 1899

In collection of George Grieve, Winnipeg

The spike below is 24 inches long. Right horn, 27 inches long; girth, 9; points, 8. Left horn, 33¾ inches long; girth, 9; points, 10.

From the Upper Ottawa, 1897

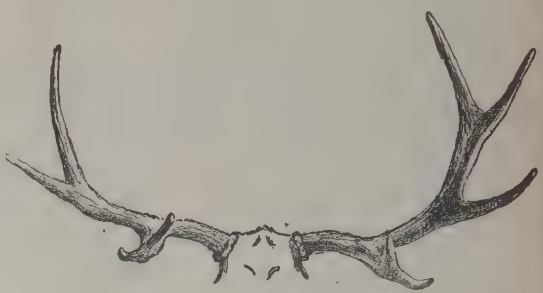
The horns were porous and spongy; probably the animal had been emasculated

Specimen now in collection of James H. Fleming, Toronto, Ontario (Greatest spread, 46 inches)

Abnormal antlers of three-year-old Moose shot at Lake Winnipeg, 1904

Now in the possession of E. W. Darbey, of Winnipeg

Spread, 31 inches; girth of right beam, 4 inches; of left, 4½ inches



From Manitoba

In collection of Alex. Calder, of Winnipeg (47 inches spread)

In Museum Can. Geol. Survey, Ottawa

His right antler is 38 inches long

From Manitoba, Dec., 1905

In collection of E. W. Darbey

PLATE XXXIV.—FREAK ANTLERS OF MOOSE

PLATE LI.—MOTHER MULE-DEER AND HER TWINS
Photograph by E. T. Seton, Yellowstone Park

PLATE LVII.—MULE-DEER ON WINTER RANGE, YELLOWSTONE

Photographs by E. T. Seton

"Twice in my own experience, had I seen shooters called up, and had resolved to follow the advice of an experienced caller, 'never to sneak a Moose.'"[104]

Many sportsmen and writers maintain that moose-calling is confined to Maine and the East, because elsewhere the Moose do not call.

Robillard, my half-breed guide on the Athabaska River, told me that moose-calling is practised regularly every fall in that country; and he showed plainly that he knew how to do it.

In Alaska, according to Osgood, "calling with the birch-bark horn, so successfully practised in eastern Canada, is not greatly in vogue, but when properly executed, is effective. Contrary to the custom in the East, the imitation of the bull is used most frequently, although evidence that bulls can be attracted by the call of the cow is not lacking."[105]

In brief, then, the Moose call and may be called from Breton to Yukon.

At the beginning of the calling season, the bulls, full of amorous rage, will go anywhere at the slightest suggestion of a cow-call. When, at length, the cows respond, and mating is about accomplished, they are ready to assail any bull that suggests a disturbance of their joy. When finally, all are mated, they no longer heed the call of another cow; and their varied later behaviour—in sometimes coming, sometimes being indifferent—means simply that the caller has chanced either on an unmated bull; or else has found a region where all are happy with their mates. After this merry moon is over, it is considered useless to call for Moose.

As to the ethics of such sport, Prof. Albert V. S. Pulling says: "Many hunters won't shoot a called bull. As for sport, it's just as sporting to shoot the old brindle bull when he comes up to the pasture gate for a handful of salt.

"A called bull may come within easy range, and hang around until he is shot. It's worse than jacking Deer, and I think that it will be prohibited by law everywhere within ten years. The bull has no show whatever, unless the hunter gets 'buck ague.' The true sport is to call him, then decide his horns are too small (as many real sportsmen do) and let him go."[106]

An Adventure in Calling

Burt Jones, in his book "The Moose," tells an amusing anecdote of a supercilious New Yorker, who had no faith in moose-calling, and nettled his guide by a general assumption of superiority. The guide, hiding his

[104]Forest & Stream, June 1, 1895, p. 442.
[105]Game Resources of Alaska, Yearbook Dept. Agri., 1907, p. 473.
[106]Forest & Stream, Nov., 1924, p. 659.

wrath, said: "I'll call up a bull Moose if you promise on your honour that you will not shoot till I give the word." The promise was given; and, climbing a high boulder at the chosen place, the guide began the magic call of the birch siren. About sunset, three bulls responded. One only, a big fellow, came on, grunting and threatening.

"When the Moose was about breaking cover, the guide climbed partly up the big rock and noted the direction from which he was coming, satisfying himself that the game would appear on the side of the boulder on which they were stationed. Another call, and the bull's hoofs were heard beating the firm ground as he trotted up the slope toward the men. In full view of the hunters, and about ten yards from them, grew a bunch of sapling birches. There the Moose paused, and began a furious onslaught with his antlers.

"Having tired of that, he turned toward the hunters, and going down on his knees, plowed his horns along the ground some distance, tossing them well loaded with vines, moss and earth. With a snort, he shook these from his head, the dirt falling on and around the two men lying behind the rock. The city man about that time was enjoying his first acute attack of Moose fever. His teeth fairly chattered, and the guide had to grip his rifle barrel to prevent it from rattling against the rock. Again the Moose came on, and stood with his broadside toward them, not more than twelve feet from the muzzle of the rifle. That was about as close quarters as the guide cared for on his own account, so he gave the word to fire."[107]

The Battle

Henry Braithwaite, the New Brunswick woodman, has given us an experience that shows how, ordinarily, the affair ends when one Moose calls another. He was "calling" for a sportsman. Two bull Moose responded, and approached "from different directions. Both Moose came grunting towards us, drawing nearer together all the time. We sat very quiet in the canoe, and finally the Moose came together two or three hundred yards from the shore, and the fun commenced. I ran the canoe ashore, and we stole quietly up till we got quite close to them. It was rough, strong work while it lasted; they were breaking down small trees and tearing up the ground. Finally, they locked horns, shoving each other a few feet back and forth, one bracing himself against a log and the other against a tree in the opposite direction. We were standing in a very open place, and fearing the Moose might break out of the position they were in, and swing towards us, I selected what I thought was the best head, and the sportsman fired at it.

[107] Habits, Haunts, and Anecdotes of the Moose, 1901, pp. 99–100.

"The Moose broke away, and swung towards us, and passed so close to the sportsman that the blood spattered over his clothes. The other Moose followed him up and I sprang forward, shouting and waving my arms, and managed to sheer him off so he didn't run over us. The wounded one went about 20 yards and fell. I came near having to shoot the other one to drive him away. I made up my mind then and there not to interfere with a Moose fight of that kind again."[108]

A still more thrilling affair is related by D. R. Howe, the well-known warden of Bras Coupe Fish and Game Club. This was the killing of his first Moose. He was about thirteen years old when he and his brother, two years younger, went for a Moose hunt in September. For canoe, they had a dugout which they called "Perog" (Pirogue). "It was a log hollowed out and shaped like a canoe, about as hard to keep right side up as an ordinary keg. I had gone heels over head out of it more than once." Their hunting ground was on the South Machias River, about 16 miles from home. Here these two kiddies made their camp. "'The next morning about 4 o'clock," he says, "we heard an awful bellow up the stream, a short distance, and grabbed our rifles, jumped into our 'Perog' and started. We knew it was a Moose calling.

"We went up stream about a mile. I was in the bow. We were both standing, poling, my rifle laid ready. Suddenly the bushes parted right under the bow, and a large black object showed up.

"I waited for nothing more, but placed three shots as quick as I could work the lever, and that was pretty quick. We heard the animal run back into the woods, then heard a heavy thud and knew it was down. We landed the 'Perog' and started in, I being in the lead. The bushes were thick as the hair on a Dog's back, with paths through them made by the game where it came to drink and feed.

"Suddenly we heard a grunt, and the bushes swayed and cracked. My brother broke and ran for the stream. I stood my ground about two seconds, then I headed for water, but too late. The Moose saw me and charged after me.

"Say, I only remember hitting the ground once. I felt his breath coming against my head. The next I knew I cleared the bank, went straight down, I don't know how deep. But when I rose to the surface, the Moose had made back to its mate which I had shot.

"There was some awful bellowing. I have heard Moose bellow a thousand times since, but never like that. I swam ashore, on the opposite side,

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[108]Forest & Stream, Aug., 1925, pp. 501–02.

crawled into the bushes and lay quiet. Suddenly the Moose came again, bellowing and tearing straight for us.

"My brother fainted. I set my jaws and waited. When the bull came in sight, I could not raise my rifle—it had suddenly grown heavy. As luck would have it, he started up the bank; I tell you I felt relieved. We waited a while, lying flat on the ground. Pretty soon we heard the brush cracking behind us. Then I *was* scared. I grabbed my brother, dragged him to the 'Perog,' put him in it, and started down stream. He came to after a little, but I would hardly let him breathe.

"We did not stop at camp, but made for home, where I got my older brother and a cousin and went back. We found the cow Moose I had shot, pretty well pounded to pieces. The two bulls had met and fought. By the way the brush was broken down, I should say that they were 'old-timers.'

"I have called and killed scores of them since, in my business as a hunter and guide, but will say I never have killed one since, that did not send the chills running down my back and start me to shaking after it was all over. Such are the effects of boyhood impressions."[109]

The actual finish of a fight is described by Morris L. Parrish. In 1912, he was hunting on Kenai Peninsula. On the 2d of October, he was privileged to be eyewitness to a duel between two giants of the Alaskan breed. He and his friend were seeking for game, when suddenly "at about a mile, through the glasses, we plainly saw two bulls (one black and one gray) in a fierce fight, with a cow looking on. They charged each other head-on, and we could hear the loud crack of their horns coming together.

"They locked antlers and tore up the ground with their feet, uprooted alder trees and shrubs, and raced and tore around in circles. We watched them for twenty minutes and then hurried over intervening ridges and flats to get a closer view. We crept up a hill, and below us was the battlefield.

"The black bull, evidently the victor, had been joined by four other bulls and two cows; but the gray bull had gone. We were about 60 yards from them. One of the cows saw us, gave the alarm, and they all disappeared into the alders.

"We then went down and looked over the ground where they had fought. It was all ploughed up; spruce and alder trees pulled up by the roots were scattered around, and bushes stamped into the ground. We found big bunches of hair from their hides; and a large point of an antler 7 inches long broken off. At the end of the break, it was evident that this

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[109]Forest & Stream, Feb. 21, 1914, p. 235.

was from the main antler, as there were some rough, scraggly pieces sticking out."[110]

The Moose and the Man

These battles with his own kind are natural and frequent. But will a Moose attack man?

George Gibbons, the guide at Deux Rivières, says "yes"; and contributes the following evidence. In 1914, he and another guide were travelling in the Ottawa country about 20 miles north of the Ottawa River, east of Mattawa. They were making a late portage with the help of a bull's-eye lantern; and on the last trip, carried the canoe.

"We had carried it about halfway when the other guide said the paddle was hurting his shoulder, so that we put it down and rested. We had no sooner laid it down there when I heard a noise in the brush not over 50 yards from us. I told Joe to turn on the light, and he did so promptly, revealing the eyes of a huge bull Moose.

"The Moose, on seeing the bull's-eye lantern, made for it immediately. My first thought was to tell Joe to shut off his lantern, which he did at once and then hied him to a tree. Not one could we find and the Moose (we felt a great amount of respect for him about then) by this time was getting uncomfortably close. Joe ran one way and I another. Fortunately for Joe, he got to a small cedar tree, and crawled up it quicker than he usually moves in the morning when called.

"The Moose evidently had his eyes on Joe on account of his having had the lantern, and this gave me a good opportunity to find a tree for myself. I had just time to get clear when he arrived at the foot of my tree; in fact, I was so close to him that I could have put my foot on his horns, only I was afraid it might not be wise, so I climbed a little higher and called to Joe to turn on his lantern, but it was in the canoe and he could not get it. I told Joe we might as well make up our minds to stay there for the night. . . .

"The Moose stood guard until 2 A. M., when he left. Nobody was ever more anxious to see a Moose arrive than we were to see ours disappear. We waited about another hour, and came down, as it was getting daylight. We were pretty hungry for supper that morning I can assure you."[111]

J. G. Lockhart's account of a young bull's temper is even better reading. Writing of Moose in the Great Slave country, about 1865, he says:

"On one occasion, three Indians were hunting and fell upon the tracks

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[110]Letter, Dec. 9, 1915.

[111]Forest & Stream, Dec. 8, 1906, p. 905.

of a female Moose and her young one. They immediately gave chase, and in a short time the 'Mannisheesh,' or young one, became fatigued and stopped. One of the Indians who had left his companions a short distance behind, approached in his haste too near the game. The young Moose instantly leaped towards him. In his eagerness to escape, his snowshoe caught in a willow, and down he went with the Moose on top of him, bucking and trampling with all four feet. His companions came up. The Moose again took to flight, and they went to pull out of the snow what they were quite certain would be a mangled corpse, but the man had scarcely received a scratch, so they shook him, and joining in a hearty laugh, started again in pursuit."[112]

A. V. S. Pulling relates the killing of a Moose by Judge Andrews of Syracuse, as follows:

"He shot a good-sized bull through the body and knocked it down. He approached it carefully, accompanied by his unarmed guide. When within a few paces, the Moose got on its feet very quickly and charged. This is the only absolutely authentic case that I know about where a wounded Moose *did* charge. The Judge fired again, hitting the Moose in the face, below the brain."[113] Another shot, and it fell almost at his feet.

Still stronger is the testimony of my old hunting pal, George H. Measham, of Winnipeg. "The Moose," he says, "is the monarch of the North American woods. He fears nothing that he can see. Woe to the Wolf, Lynx, or even Bear, that gets a blow from his sharp hoofed fore foot. A blow from an axe were better. Woe to the hunter whose eye or nerve fails him, when he is charged by the giant bull. I know of more than one life-long cripple, and have heard of more than one death, as the result of the monster's headlong charge."[114]

The Young Bull

The young bull Moose is tolerated by the stepfather while he is yet a calf; that is, he is allowed to be in the neighbourhood at a respectful distance. But in his second year, he begins to have feelings of his own, and will fly from his new relative-by-marriage, if he knows what is good for his young skin. At this time, he is a "spike-buck," that is, his antlers (his second pair) are forked into a couple of spikes. After his mother's recurrent honeymoon, he may drift back to the family group; and thus come, in a sense, under the protection of his stepfather till the end of the winter.

[112]Habits, p. 307.

[113]Forest & Stream, Nov., 1924, p. 688.

[114]Personal letter, 1902.

Spring moving scatters the family as before; and September sees him fully equipped with flat horns, lusty body, and ambitions—everything, indeed, needful to replenish his corner of the earth, except a mate, and personal prowess to secure one.

He may try a passage-of-arms with some big fellow who is on the road to good luck; but usually he has to save himself by flight into regions far away

At this season, young bulls are found roving over the country in most unlikely places. One walked through the main street of Carberry, Manitoba, some years ago. Another was shot out on the open prairie 20 miles from Moose Mountain. Many similar cases are recorded from Vermont and New Hampshire; and in each, it seems to have been a hopeful young bull Moose going out into the world to seek his fortune.

The Unmated

The "old bachelor" and the "old maid" are well-known characters in all the higher walks of animal life. Among American ruminants, they are known as the "lone bull" and the "barren cow." The lone bull is usually an old fellow who has outgrown the ardour of youth. Some believe him to be one whose mate has died. He generally wanders alone, and is of uncertain temper. The barren cow is commonly so by mischance, and is distinguished first by her fine condition; second, by the absence of calf.

Roderick MacFarlane writes: "Hunters assert that hermaphrodite and barren females are sometimes met with; and that these imperfect examples almost invariably attain a larger size and heavier weight than their fertile kindred."[115]

According to many guides, bulls are usually seen in pairs throughout the summer; and these two are almost certainly twin brothers who continue together except during the time when trouble and dissension are imported by the other sex.

Autumn Life

The Moose has to condense his intenser pleasures into a couple of weeks, so takes them seriously. During this time, he even forgets to eat; and, on returning from his wedding trip, he is no better than a spent salmon, or the last run of shad—which are parallelisms for the same effect from the same cause, and are understood to mean also "not fit for human food."

The old Moose has no longer any well-founded objections to receiving his step children back into the family; and, as noted already, the group in

[115]Mamm. N. W. T., pp. 678–79.

the Moose yard that winter is usually the mother, the children, and the father that probably is not theirs. Sex scarcely counts in this heavenly passionless time.

Winter Life in the Yard

The "yarding of the Moose" is a familiar phrase that has given rise to several misconceptions. Many persons think that a Moose yard is a large place, having all the snow in it trampled or shovelled down smooth, and surrounded by a straight wall of untrodden or heaped-up snow, with the deep, unbroken stretch of white beyond. They imagine, further, that, as soon as a storm begins, the Moose get to work, hoof and horn, to hammer the new snow down level and hard within the yard.

The fact is that, when the snow commences to deepen, so that travel becomes more difficult, a reunited Moose family—father, mother, and little ones—seek out some sheltered place of abundant food; and, by winding daily in this, cover the ground with a network of pathways. The longer they stay, the more numerous and the wider the pathways become, so that, finally, there are but few untrodden spaces of twenty yards across.

James E. Powell, a Moose expert, says: "A Moose yard frequently occupies about 100 acres, more or less; but the latter few weeks of the season are frequently spent on an area of 10 acres or less.

"The old males and females never yard together, but sometimes the young animals are found occupying the same yard. Still they are seldom found in close company. The females and their calves frequently yard together, the calves remaining with their mother one year. The oldest males invariably yard alone, choosing some lonely knoll or mountain peak, where they reside in utter solitude. Indeed, as age increases, the Moose becomes more solitary in his habits, avoiding the common resorts of other Moose, and frequenting some lone little pond or stream. The Moose of 2 or 3 years old, also, often yard alone; but the males between the ages of 3 and 10 years are very gregarious. I have known as many as 9 in one yard."[116]

To this, Mitigwab, my Quebec guide, added that usually the bulls yard apart; but he had seen in one yard, 4 bulls, 1 cow and 3 calves.

The good footing afforded by the pathways in the yard gives the Moose a guarantee of security against Wolves; but that same circumstance renders them doubly open to man's attack. For he can find the big brutes easily, and they cannot escape. When he finds them in a yard, says George H. Measham, "the experienced hunter will make sad havoc of the assembled Moose. Thus an Indian hunter, Cake-ka-po by name, and his

[116] Quoted by Hind, Expl. Lab., I, p. 125.

son, a few years ago killed 9 Moose in as many minutes. They had yarded in a bluff and when attacked, the animals became stupefied by terror."[117]

The deeper the snow in the woods, the harder the Moose must work for their food, since the lower bushes and ground herbs are not now available; and thus the difference between the snow in the yard and that in the woods increases.

If the food is sufficiently abundant in the yard, and the Moose are unmolested, they stay till spring. If the food gives out, they must begin a perilous journey through the snow in search of another good place.

On these occasions, they march in single file and each steps in the tracks of the one before; so that the labour is lessened and the young ones in the rear do not have a very hard time. The journey is usually done with judgment founded on their memory of the country. A new feeding ground is safely possessed, provided always that the travellers do not meet with Wolves, or worse—the two-legged fiends on snowshoes.

Moose-Birds

A Moose yard is commonly frequented throughout the winter by the moose-birds or Canada-jays (*P. canadensis*). I cannot guess why, unless the Moose, by tearing down and rooting up logs and dead trees, exposes worms, etc.; or perhaps the parasites in the Moose's coat furnish food for the bird. There are several other cases of small birds associating with large beasts; and, in each, the bird is believed to serve the beast as watchman, and get his compensation in food possibilities.

His Smell Power

There is always a delightful uncertainty about a highly organized being. You never know what he will do next—all rules fail.

There have been given many cases of Moose staring unappalled at some man, or calmly demanding the right of way over some hunter. Then, again, comes evidence that the high-strung giant is the shyest of the shy—more timid than a hare.

In illustration, Measham writes me: "The Moose fears nothing that he can see—which means little, for his sight is indifferent. But let him get one faint whiff of a human being, and he flies headlong in any direction that is open to him. Nor does he soon stop; he means to put many miles between himself and his enemy."

It is hard to give a human being, with his dull, dumb nose, any ade-

[117]Personal letter, Dec. 11, 1899.

quate idea of the smell power of a Moose. We know how quick we are to smell a Skunk. If the creature has fired his scent even a mile away, we are conscious of it down-wind within a few minutes; and when it is but 50 yards away, it is so strong as to be nauseating. This is exactly the Moose's measure of the man-smell; and having it associated with the idea of fearful danger, he sets out for parts unknown when he gets even the whiff that means a man is within a mile. Noises are mere warnings; complete information must be supplied by his nose. So when he "hears footfalls and crackling boughs, he will sometimes make a semicircle, and get behind the noise that alarms him; will even nose the tracks of the hunter like a Dog. Once sure that these are man tracks, the Moose is adequately warned—pursuit of him is hopeless.

"The Moose then, has keen scent, sharp ears, and dull eyes. He is always alert, and in calm weather, is practically unapproachable. He feeds at night, he is down most of the day, will rarely cross an open space in the day-time unless frightened."[118]

The Moose is amazingly gifted in two sense departments at least. Beauty may be, as Keats claimed long ago, perfect adaptation of part to purpose; and yet as E. C. Oberholzer epigrammatically observes, "It is remarkable that the two least dignified parts of a Moose conceal his acutest organs of sense. I wonder if any other creature has so ugly and so delicate a snout. It is full of the finest muscles, which analyse every zephyr and betray the most distant enemy. Moreover, it is the Moose's 'mirror of the soul,' expressing fear, anger, distrust—every emotion—by its flexibility.

"So also of the ears. In spite of their size, what nice discriminations, what acoustic properties! If the Moose is willing, you may sometimes approach him even when he scents you, as we occasionally did; you may even sit within plain view not 15 feet away, especially during the rutting season; but speak a word above a whisper, and the spell is broken. There is something eerie, it seems, about the sound of a man's voice."[119]

It has been found numberless times that a Moose seeing a man, *without smelling* him, is likely to stand and gaze at him in blank curiosity. This happens oftenest during the summer, while the Moose is in the water, and the man in a canoe. Such occasions afford great chances to the camera-hunter. Nearly all good photographs of wild Moose have been taken at such times.

Commenting on this habit, R. MacFarlane says: "While standing in the water, they sometimes seem quite indifferent to the near presence of

[118]Personal letter, Dec. 11, 1899.

[119]Field & Stream, Feb., 1917, p. 334.

man, and will then retire only after being repeatedly fired at. I myself had proof of this on one occasion when ascending the Anderson River in the end of June, 1866. There were five or six in the party, when we observed three full-grown Moose in the water. As they were not in good condition, we did not care to kill them, but in order to test the truth of this peculiarity, I made the Indians fire a number of shots very close to them, but to no purpose. In fact, we had to scream and yell at them before they got out and stalked away at a very leisurely pace."[120]

A Different View

George Shiras 3rd makes a wholly different estimate of the Moose's smell power. After a lifetime of experience with the species, he writes me: "For more than 30 years I have studied the Moose on their ranges, including Alaska, New Brunswick, Maine, Michigan, Minnesota, Wyoming, and about a thousand miles of the northern side of Lake Huron and Lake Superior. In that time, I have seen more than 1000 Moose at close range, photographing some 200 in the daytime at a distance of from 25 to 150 feet; and nearly 200 at night by flashlight, at distances from 10 to 30 feet. In all that period, I never saw more than 4 or 5 Moose that evinced any great alarm at human scent.

"On a lake in St. Ignace Island, Lake Superior, I took the pictures of 4 separate animals feeding at a distance of 75 feet, with the wind blowing directly from the canoe to the shore; and these animals showed no alarm. In two other bays, and under the same conditions, two Moose moved off rapidly when they got my scent.

"In New Brunswick, I sat all day in a blind, facing a natural salt-lick where the Deer and Moose had destroyed the vegetation for a circle of about 60 feet. In taking pictures of a dozen Moose at this close range, not one of them seemed to be aware of my presence, except at the sound of the focal plane shutter, although moving about, for an hour or two within a comparatively few feet of me. One Moose came down directly behind the blind, passed to my left at a distance of not over 3 feet, and then began digging into the saline soil about 10 feet away. He was so close that I could only get his head and shoulders on the plate; and finally had to scare him back a few feet farther. This Moose stayed an hour, and practically passed entirely around the blind, where two of us were seated, without showing any signs of fear. The Whitetailed Deer, however, that came to the lick, soon detected our presence.

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[120]Mamm. N. W. T., p. 678.

"In Minnesota, one night our canoe approached several Moose in a heavy fog, and the ripples caused by the feeding animals were visible. Finally, the fog lifted for a moment, and I found two cow Moose about 25 feet in front of the canoe, and a bull Moose on either side, not over 15 feet away. As the jacklight blazed forth clearly for the first time, one of the cow Moose swam directly toward the canoe, and when it was about 5 feet away, I fired the flash in its face to avoid a collision. The fog again descended, and we left all the animals apparently feeding in the same place.

"In Alaska, several times Moose have circled the blind, without paying any attention to my presence.

"On a summer night, north of Lake Superior, when waiting at a slough filled with lily-pads, a big bull Moose approached, and we expected it to come beyond the water bushes fringing the bank. But, instead, it began feeding just out of sight, where the wet ground contained tender vegetation. On standing up several times in the canoe, and turning the jacklight over the bushes, we could see the head and large antlers of this animal, as he moved about from place to place. At no time was he more than 25 feet away, and often less than 10 feet. Here we sat for an hour, listening to this big bull as he fed and walked about in the muddy soil. Finally, having satisfied his appetite, the animal retired.

"Is it possible to conceive of any other game animal, big or little, that would stay almost within touching distance of a paddle, where the shifting night winds must have covered a space of more than a hundred yards?

"From these instances, and many others, I rate the scenting power of a Moose lower than any other animal, big or little, that I know of, except a Porcupine."

In seeking to explain these unusual experiences, it is well to keep in mind the fact that animals sense one's attitude—friendliness or hostility. Shiras is deeply imbued with sympathy, with kindly feelings towards the Moose. His mood and manner, therefore his emanations, were intensely friendly. This may explain why so many Moose have lingered near him, unafraid, while from other hunters they flee with every evidence of fear and hate.

Erratic Behaviour

Although, ordinarily, the Moose are the wariest of wild things, there are many cases of unshyness on record, from which I select the following:

George W. Lewis, of Newham, Conn., writes, concerning his trip in northern Maine, near Lake Sourdnahonk, Sept., 1898:

"About 6 o'clock, a young bull was seen in the lake about half a mile

from camp. A hasty canoe trip brought us very close to his lordship, who did not seem at all disturbed by our presence. After looking at us awhile, he finally trotted off into the woods.

"An hour later, while at breakfast, as we were discussing our acquaintances of the early morning, the cook came running into the dining room with the statement that Mr. Moose was at our camp door. Of course, such a sight was not to be missed, and hurrying out, sure enough there the same Moose stood beside the woodpile, less than 10 rods from the camp.

"He remained there about three minutes, when he leisurely walked away, and the incident was forgotten until we were seated at dinner, when the cook again called to us, 'that Moose is out in the yard again.' This time he was standing in the edge of the lake, about 12 rods from camp. He was a young bull with but four points. The velvet was hanging from his horns, which gave him an odd appearance. It is not often that a Moose will present himself for inspection three times in one day."[121]

Fred C. Reeves, guide of Kippewa region, related the following: "About Nov. 13, 1901, I was out with Mr. Halsted Scudder, between Blue Lake and Gideon Falls, 40 miles north of Mattawa. We stopped for noon lunch. I chopped enough dry cedar to make a fire and boil our kettle. We talked and waited about an hour. Then we walked 200 yards up the road, and came on a Moose family—old bull, cow, and last spring's calf—all lying down in the hardwood timber at the edge of a cedar swamp. We had the wind, so they did not smell us; but they must have heard us chopping, and yet paid no attention. While we watched, the calf got up and walked out of sight. The old ones lay still. The bull, I noticed, was chewing his cud. We backed off, and left them unmolested."

Ignatius Sargeant, of Waltham, Mass., is responsible for the following account: He and Manfred Priest, the guide, were in Ketchum's camp near Passunduncook Lake, Me. In camp, they had a Horse, which Priest was leading. Suddenly, he realized that the Horse was being followed by a bull Moose.

"It several times came very close, when Priest got off and threw clubs at it. When hit on the head, it would throw up its head and snort, and as soon as Priest remounted, it would again follow the Horse. It finally turned back just before Ketchum appeared.

"Although a very singular thing, still this is not the only time a Moose has been known to follow a Horse. Only a few years ago, one was shot by a boy in the town of Lowell, Me., while it was chasing a Horse around

[121]Forest & Stream, Jan. 28, 1899, p. 66.

in a pasture. In one case—and I think in both—the animals chased were mares."[122]

Shiras contributes the following: "One time on an Ontario lake, I recall approaching a very large bull Moose feeding in deep water, to within a distance of 10 feet, the animal having its head under water most of the time. When the canoe and its near-by occupants were discovered, this animal swam slowly to a rocky point some 50 feet away, climbed out of the water with great deliberation, and walked off until it reached a fringe of bushes, when a crashing sound for several hundred yards indicated that, when under cover, it gave evidence of extreme alarm which had been so well concealed when we were within a few feet of it.

"On another occasion in the Upper Yellowstone Valley, I walked to within a hundred feet of a large bull Moose, and a smaller companion. These animals stood fixedly looking at me as I approached in an open meadow, and after several pictures were taken, the large bull turned and walked off slowly, followed by the younger one. After going about a hundred yards, they broke into a run, and I ascended a near-by foothill and traced their course for 3 miles across the valley, there being no slackening in their speed. The next afternoon, I found this same pair 12 miles away in the southwest bay of Yellowstone Lake. Thus, we have an instance where both animals could have been shot without any difficulty, and yet when finally alarmed, left for an entirely new range."

Illustrating another peculiarity, Shiras says:

"Even the flashlight does not disturb them, and in several instances, I took pictures of bull Moose two or three times in quick succession while they stood facing the canoe, when the light or explosion could be seen or heard many miles away.

"I, therefore, came definitely to the conclusion that the Moose regarded the exploding flashlight merely as a case of thunder and lightning. In one instance, a Moose had its head up, in deep water, as I fired the flash, when it immediately plunged under again for another lily root, coming up just in time to get the second flash. Once, when the flashlight missed fire, the percussion cap gave a sharp crack, and the Moose immediately turned and ran ashore, associating this comparatively slight sound with the breaking of a twig. I then followed it and later got two pictures at about 25 feet."

Another remarkable weakness of the species is the deep sleep that sometimes possesses it. An instance of this was related to me by William Clark, of the Hudson's Bay Company, at Winnipeg:

He was crossing the Interlaken, the wooded country between Lakes

[122]Forest & Stream, Nov. 6, 1897, p. 364.

Manitoba and Winnipeg, in the early spring, and had with him a dog-team drawing a loaded sled, a couple of hounds running loose, and an Indian guide. The Dogs were being driven with the usual amount of shouting and noise, and this was increased as they came to a steep place. On the hill was a tall spruce, and as there was no trail, the Indian climbed it to ascertain the best route. When he was at the top, they held a conversation in tones suited to the distance between them. Just after he came down, the Dogs that were beating about, chanced into a thicket close by, and with a great uproar put up a pair of Moose that had evidently lain asleep through all the clamour of the travelling and shouting. Of course, no gun was handy, so they got away.

Miller Christy asks if it is not possible that these Moose were intentionally hiding.

Habits in General

As the warm weather comes on, the Moose are driven out of the thick woods by the heat and the flies. They now gather at the lakes, and beside large rivers, where they can enjoy a cool bath every day, get what breeze there is moving, and revel in the lily-pads that abound in such places. During the summer months, the Moose may be considered a semi-aquatic animal. Male and female, old and young, they frequent these summer watering places, but usually the bulls keep by themselves in groups of two, or even wander alone. Many of the guides say that the pair of bull Moose commonly seen together in summer are twin brothers.

Speaking of the creature's woodcraftiness, Lockhart says: "They generally lie down with their tails to windward, trusting to their senses of hearing and smelling, which are remarkably acute, to warn them of approaching danger from that quarter; they can use their eyes to warn them of danger to leeward, where hearing, and especially smelling, would be of little use. . . . .

"They also have the remarkable instinct to make a short turn, and sleep below the wind of their fresh track; so that any one falling thereon and following it up, is sure to be heard or smelt before he can get within shooting distance."[123]

Sometimes cunning is not distinguishable from stupidity, as the following by Shiras may be explained either way: "The Moose, when disturbed, seldom shows any immediate evidence of fear, but generally walks off slowly, then breaks into a trot and finally into a mad rush, as if the devil were in pursuit. It is for this reason that Moose are so easily shot, for in-

[123]Habits, p. 308.

stead of dashing away at the first sign of danger, this large, bulky animal gives the hunter a chance to fire the fatal shot. Hundreds of instances are known where big bulls have been shot through the body, and a second or third shot fired before they have moved more than a few feet away."

Social Games

Though the least gregarious of our Deer, the Moose is not without social amusements. Their yarding is a friendly gathering for the enjoyment and benefits of each other's society. According to many hunters, however, they have also a weird performance that seems to be as contagious and psychologically deep-rooted as the "voodoo dance"—paralleling, indeed, the circle dance of the Wapiti, already described.

Vague reports of this have long been current, so that I was not greatly surprised to receive the following. It was communicated to Thornton W. Burgess (Jan. 11, 1926) by C. Avard White, of Shediac, N. B.

"In the fall of 1924, I was following a Moose track. Soon it joined a Moose trail and followed it. Within a quarter of a mile, it led to a small open space in a bog. There was a tree in the center, about which, for 8 feet, the moss was hardly trampled at all. For the next 10 or 12 feet, it looked as if a team of Horses had been driven around hundreds of times in a circle. There were about 8 Moose roads leading to it like spokes in a wheel. It certainly did not appear as if they had been feeding there. I never saw anything like it before.

"About two weeks later, after the snow was on the ground, I was following a bull and a cow Moose, in company with a friend. The bull left the cow, and I followed his tracks while my friend kept on the cow's trail. In a few minutes, I came to this 'Merry-go-round,' as we called it. The bull had made a complete circle around without stopping, then cut off and rejoined the cow." (See Plate.)

George Shiras does not accept this explanation. He says: "I think the chances are nine out of ten that the locality referred to is a natural salt lick; especially in view of the fact that a large number of permanent runways radiate from the merry-go-round."[124]

Odd and Fatal Accidents

C. M. Stark of Dunbarton, N. H., writes under date of June 20, 1895, that on his last trip to Nova Scotia, an old-timer described the enormous antlers of the Moose that he used to hunt. "He spoke of a couple of sets

[124]Personal letter, April 20, 1926.

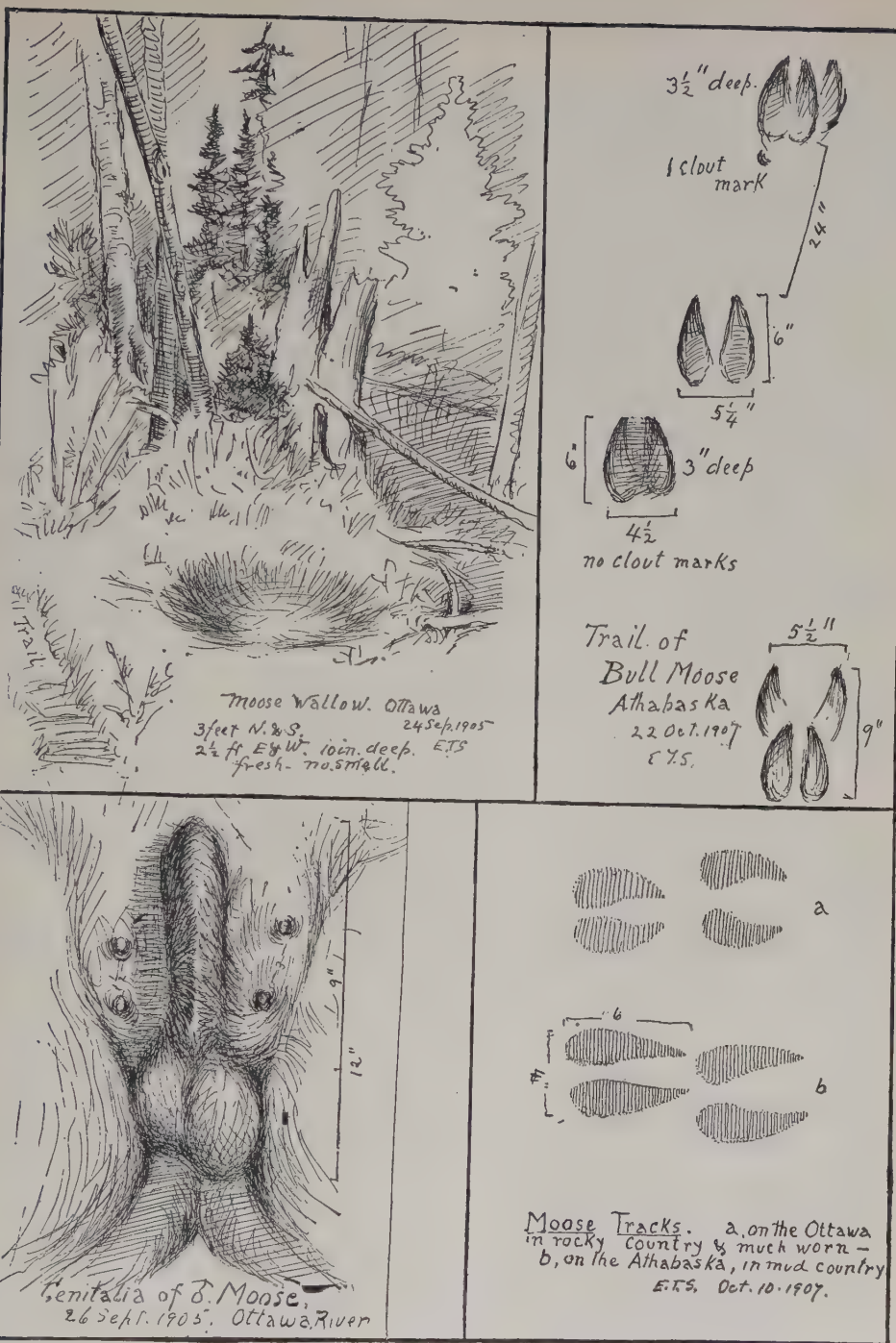

Plate XXXVII – Moose Tracks & Details

of very large horns which he had seen years before, lying on a certain barren —the horns and skulls together. The former were firmly locked together, and a tine of one brow antler was driven into the eye-socket of the other and imbedded in the bone at the back. They had lain there for years, and were much bleached and crumbled."[125]

A most singular case came to my knowledge in Manitoba some years ago. It will be remembered that, after the failure of the first Atlantic cable, in 1858, a telegraph line was planned across the continent by way of Winnipeg and Alaska, to be carried under Bering Strait and overland to St. Petersburg and Paris. This was completed for some hundreds of miles, when the success of the new cable in 1867 put a stop to the work; and the useless wire hung there till the poles rotted. This wire, however, was well galvanized, and is sound to-day.

In the fall of 1884, a bull Moose butting playfully at one of the tottering poles, brought it down on his head; and presently found the wire entangled in his antlers. He struggled and tussled, getting more and more wound up, until he was helpless, and died there. The carcass was found by Chief Metwayash some weeks afterward. It was a very fine, large Moose, and had over 200 pounds of wire fast to his head and horns. The ground around for an acre was beaten and trampled black—not a stick or a green thing was left on it.

"In his report to the Maine Game Commission, E. E. Sweet, of Mars Hill, one of the game wardens, tells of an extraordinary accident which seems to have happened to a large bull Moose near Presqu' Isle Lake.

"He found the animal lying on its side with one of its horns tangled in a broken blow-down. The Moose seemed to have fallen, and, in striving to rise, its legs had been thrust under the log into soft ground, so that it was impossible for the animal to get out.

"With the aid of a lumberman, Mr. Sweet cut the Moose free from his fastenings, and pulled him out, but he was unable to rise to his feet, and seemed to be paralysed. The indications were that he had been in this predicament for several days. They tried to feed the Moose, but he would not eat, and died the next day."[126]

Of similar nature is the following from the pen of Capt. Campbell Hardy:

"Moose not unfrequently perish in the woods through becoming entangled in some natural snare, or by breaking their legs amongst the rents

[125]Forest & Stream, July 6, 1895, p. 6.

[126]Forest & Stream, Nov. 12, 1910, p. 776.

and holes in the rocks which strew the country, and are often concealed by a carpet of moss. A few falls since, I stumbled by chance upon the body of a Moose which had recently met with an accidental death under the following curious circumstances. I was crossing a deep still-water brook in the forest, on a log fallen from bank to bank, when my attention was arrested by the disturbed appearance of the bank, and by the bark being rubbed off the bottom of a large spruce tree which grew over the water on the opposite side.

"Completely submerged below the surface was the body of a large bull Moose, his antlers just peeping above the water. A thick root of the spruce grew out of the bank, and, curving round, reëntered it, forming a strong loop. Into this, the unfortunate Moose, in attempting to cross the brook at this point, had accidentally slipped one of his hind-legs up to the hock, and the looped root being narrow, he was unable to extricate it. A prisoner, for who can tell how long, the unhappy animal perished from starvation, and at last sank into the stagnant brook. The denuded state of the stem of the spruce, and the broken bushes around, showed with what violence his struggles had been attended."[127]

In Dire Extremity

There is a curious side to animal nature, seen in most highly organized species, and illustrated in the Moose by the following instances:

The first was related by George Crawford, the well-known guide of Mattawa, as follows:

In March, 1888 (or 1889), while out with his partner to catch Moose for Dr. Seward Webb, they came on a Moose calf track in the deep snow. There was no sign of a cow, so they turned their Dog loose. Very soon they heard him barking, and came up to the calf. It rushed toward them with bristling mane. His partner ran, and Crawford got behind a tree. The calf charged up to him, and quickly wheeled to face the Dog. It paid no heed to the man then; but when he turned homeward, it followed for protection, crowding up close and watching the Dog. At home, he put a halter on it, and it allowed him to lead it quietly into the stable. It was shipped to Doctor Webb, and is now at large in the Adirondacks.

The following was related to me by Édouard Crête, of Deux Rivières:

In late Sept., 1893, a mail-carrier was starting from Bear Lake to Deux Rivières. Crête showed him a short cut over Brulé Lake. Some hours later, two men were out that way looking for axe handles, and heard the mail-carrier shouting for help. Instead of going to him, they ran back

[127] Forest Life in Acadie, 1869, App., p. 358.

to camp in great fear. Crête picked up a rifle, and went with the foreman as fast as possible. They heard the mail-carrier as soon as they came within half a mile. When near enough, he shouted, "A Moose has me up a tree." They came close, and saw it was a cow Moose. She would neither go away nor charge; indeed, she paid little attention to the newcomers. The foreman, Jean Basquin, walked up to within 20 yards and shot her.

The mail-carrier said that he had come on the cow suddenly. She was alone, but came running towards him squealing. Her mane was up, and she seemed to be threatening him. He had nothing but a hatchet, so he ran for a tree; and happened to find one leaning so much that he could walk up. She followed him within touching distance all the way, but did not strike at him. The tree at the highest point was only 10 feet up. Here the man sat, with the Moose below. She could easily have reached him, but made no attempt to do so. There she stayed watching him; her mane bristled all the time. When she heard the other men coming, she merely turned her head; but during the three hours she kept the man up that tree, she did not leave the spot for a moment.

After skinning her carcass, a very unexpected condition was brought to light. Evidently she had been attacked by a bull Moose a few days before. The horns had pierced her left side in five places; inflammation had begun and matter had formed in four of them. She must have been suffering great pain, and would probably have died before long. They could not make out why she should go to the man, but it is quite sure she was not there to do him any harm, for she had every opportunity to do so and did not strike at him even once.

This instinct, when in deep trouble or flying from great danger, blindly to trust another power, that may not be friendly but certainly is superior—to seize on the one remaining hope—is as deep-rooted as it is remarkable. We see signs of it throughout the animal creation; and the higher the species, the more marked it is.

We have been looking among the animals for the rudiments of civilization; possibly, in this, we see the rudiments of something else that finds its highest development in man.

Those who wish to read a thrilling story of a dare-devil exploit, should look up the account of Dr. Thomas Travis's ride on a wild bull Moose in the woods of New Brunswick. Men have ridden bull Moose before now, but never before with the deliberate, sustained, and successful purpose of supplying food for the films.[128]

[128]Forest & Stream, Dec., 1924, pp. 732 ff.

The Moose I Called

Some forty miles north of Mattawa, Quebec, it happened; and in the September of 1905. Two good friends, Mr. and Mrs. W. E. Bemis of New York, with my wife and self, were camping in the Moose range, rejoicing in the daily small exploits of finding flowers, moss, Squirrel doings, Bear sign, Wolf sign, and in hearing the nearly nightly soft, far moaning of the Timber Wolf.

But our two friends were there to get a Moose. Indian, French, and American guides were with us; and our evening talk by the blazing pine knots was of record heads and Moose calls.

"Mebbe so you can call?" said the French guide politely.

"Yes," I said, "I can a little—but a very little." Which was true, for I had learned the moose-calling rather as an illustration for my platform work. I had called Moose, but never to their death.

The half-breed handed me his birchen horn. I gave a few grunts, then three bellows—the last long and loud—the ringing call of a cow Moose in search of a mate. Then I gave the deep "*Oo-wah, oo-wah*" of the bull, and slashed the brush with a piece of thin board that lay at hand.

"Very good," said the Frenchman; but the Indian said: "Too loud—cow call more soft."

"The horn is new to me. To-morrow I shall make my own horn and do it better," was my reply.

Next day, Will Bemis wounded a Moose, but it got away. The guide said it was only scratched; but Will was a dead shot—at target practice, at least—and was certain it was *his* Moose. The guide was rebellious, and refused to do the hard trailing that would be entailed by a follow-up.

"Seton, won't you follow that Moose for me?"

"Yes," I said, for trailing was one of my specialties, and I was glad to please my friend.

It was straight, hard trailing over granite ridges, bare rocky ground, through swamps and slashings. At first there was a faint splash of blood at long intervals; then, at an alder thicket, I found where the bull had rubbed himself, and I was able to announce a shoulder wound "but so little blood that I think it is only a scratch."

Still I followed, sometimes with great difficulty, where dry leaves were deep or rocks abundant. Sometimes other trails crossed it, but I kept on for a mile and a half. By this time, my friend was played out, for he weighed over 200 pounds, and was desk-soft.

"See," I said, "there is no blood now at all. The Moose is striding

along as usual; but I will follow until I am certain," thinking I might sight the bull in some open stretch or burnt land.

So away I went for nearly two miles more, and then I came to an alder swamp, where the Moose had settled down comfortably to feed. I never saw him, but now I knew that the guide was right.

On the back trail, I met the guide, and the one low, soft grunt he gave at my report, was the equivalent of "I told you so; now you will trust the guide next time." He liked me after that.

By the fire, that night, I fashioned a birch-bark horn of my own. It was of regular size, but only one thickness, and sewn with wattap (spruce roots). The Indian watched me and grunted approval. Then I took ink, and on it drew two dancing medicine men each with a Moose's mask and horns. The Indian shook his head, and said: "Bad medicine," which means a hoodoo. "No," I said, "good medicine," which means a mascot. Still the Indian shook his head.

Next day, it was my wife's turn to try for a bull. She was not blood athirst, but it seemed her duty to our host. She and I and the youngest guide set out per canoe for Foley's Lake, a small, sedgy pond seven silent miles away. There was but one gun in the party—the carbine that my wife had used in the Rockies with success. I took my hoodoo horn. The guide and I paddled.

The red sun was purpling the tall black masts of a last year's forest fire, as we reached the silent lake. I put the hoodoo horn to my lips, and gave a short hankering grunt. Then another, in case a bull might be very near. But the silence was complete.

For fifteen minutes I waited. Then, after a couple of peevish grunts, slowly weaving figures-of-eight in the air with the trumpet mouth, I gave the long hankering cow-call, the love bellow, the plaint of a maiden all forlorn.

"That's all right," said the guide, "only don't do it any louder."

For twenty minutes by the watch I waited. The silence was blank; the forest seemed steeped in it.

Then again I raised the horn, and after three petulant grunts, made the magic figure in the air, as I poured out the sad, sad plaint of a cow Moose—willing, but unmated.

The sun was gone. The long low lights of the west were fading, when from a ridge a mile or two away, the first sound came that we had heard from the woods—the scratching of a tree trunk, the smashing of smaller branches.

"Sounds almost like a Bear," whispered the guide. Then we heard the

slashing of brushwood half a mile away. And finally a deep grunted "*oo-wah, oo-wah, oo-wah.*"

"Bull—bull Moose," whispered the guide. We waited ten minutes, then I used the horn, giving out softly a whining, hankering "errr-errr."

After five minutes of anxious waiting, the willows in a swamp 200 yards away were seen to wave. A minute later, out in marvellous silence there strode a huge bull Moose.

How big and gray he looked! What a massive neck! And high above was a pair of yellow-brown antlers, fringed with ivory points. They looked like record-breakers, and the guide whispered: "A big fellow! A regular buster! Get ready for him!"

We steadied the canoe as the girlish figure in the bow arose and prepared to shoot.

On came the bull, striding and fearless, but silent. On, on, till only 60 yards away.

"Take him now," breathed the guide.

The rifle spoke. The big brute, stung and astonished, wheeled around, then stood again. A second shot, and he trotted into the bushes as though untouched. But a low crash sounded among the alders. A short deep "ugh" came from the place.

"He's down," exclaimed the guide.

We landed quickly. From the bushes came a long, low moan, and another. "Oh, let me get another shot! I can't stand to have him tortured," said a female voice.

We pushed cautiously forward. The monster was down, but the big head swung up spasmodically from time to time. A cautious crawl-up, the rifle cracked, and the chapter ended not more than five minutes from the first approach.

That night, I overheard the guides discussing me. They spoke in French and were not guarded in their speech. The Indian was puzzled over the success of the hoodoo horn. The guide of the wounded Moose episode was frankly for me; but the French half-breed, beaten in his argument against me, said in Quebec patois:

"Well, I don't care. He's not as good as a regular guide."

I felt happy. He was praising me with faint damns.

That is twenty years ago. I have lived some forty years since, but I have never called another Moose to his death. Thoughtful men call it foul play.

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The Virginian Deer, Whitetail, Whitetailed Deer, Longtailed Deer, Bannertail, American Fallow Deer

Odocoileus virginianus (Boddaert)

(Gr. *odous*, a tooth, and *koilos*, a hollow or cave, badly Latinized by Rafinesque into *Odocoileus*, should have been *Odonloecælas;* probably given because the type tooth was found in a cave; L. *virginianus*, of Virginia)

Cervus virginianus Boddaert, 1784, Elen. Anim., I, p. 136.
Odocoileus virginianus Merriam, 1898, Proc. Biol. Soc. Wash., Apr. 30, XII, p. 100.

Type Locality—Virginia

French Canadian, *le Daim fauve à queue blanche; le Chevreuil; le Cerf de Virginie.*
Cree and Ojibway, *Wab-ai-ush* (Whitetail).
Yankton Sioux, *Tah-chah Seentay-skah.*
Ogallala Sioux, *Tah-heenchálah* (Deer).

The genus *Odocoileus* (Rafinesque, 1832) has, in addition to all the family characteristics: Antlers in the ♂ only; no brow or bez-tines, but an upright snag near the base inside; a metatarsal or mid-leg gland on outer side; tail, long; no canine teeth; the distal or lower ends of the metacarpals or outer front toes, remaining; young, spotted. Teeth as in *Cervus*, but canines rarely present.

The ♂ Virginian Deer is easily distinguished from those of the Mule-deer and Coast Deer group by the form of its antlers (see Plate), which have one main beam, bending forward and bearing the tines behind. But a better mark—one which is found in both sexes and at all ages, is the metatarsal or mid-leg gland on the outer side of the hind shank (see Plate), which is about 1 in. long in the Virginian Deer, 2 in. in the Coast Deer, and about 5 in the Mule-deer, and margined with a band of pure white hair in the Virginian Deer only. The tails also are very distinctive, as will be seen on reference to the Plate.

Size. A typical Virginian Deer ♂: Total length, 72 in. (1826 mm.); tail, 6 in. (152 mm.); hind foot, $19\frac{1}{4}$ in. (488 mm.); ear, $5\frac{1}{2}$ in. (140 mm.). ♀ about a quarter less.

A fine adult ♂ of the Northern form (No. 104891, U. S. N. M.), killed

Nov. 15, 1900, near Floodwood on the St. Louis River, 60 miles west of Duluth, Minn., I measured in the flesh, as follows: Length, 6 ft. 5½ in. (1,965 mm.); tail, 11½ in. (292 mm.); hind foot, 20½ in. (520 mm.); height at shoulders, 3 ft. 5 in. (1,040 mm.); body, ischium to manubrium, 4 ft. 2 in. (1,270 mm.); depth at chest, 16 in. (406 mm.); elbow to ground, 26 in. (660 mm.); length of head, nose to occiput, 13½ in. (343 mm.); length of ear, 9 in. (228 mm.).

Weight. An average buck from Virginia would weigh alive about 150 lbs., and an average doe 100 lbs. But northward to the limit of the species, these weights may be doubled and, southward, they are ⅓ less.

The average dressed weight of 562 Deer shipped out of the Adirondacks by the express company in 1895 was only 109⅛ lbs., a live weight of 136¼ lbs. each[1]; but this included many small Deer, and August specimens of all ages and sexes. An average full-grown doe of the region weighs about 150 lbs. (live weight) and an average buck 200 lbs. Bucks of 300 lbs. weight are killed every year.

The Duluth specimen described above was 222 lbs., which would give a live weight of about 280 lbs. Another specimen, taken about the same time and place, was 150 lbs. in weight, that is, about 190 lbs. live weight. The maximum weight of the Northern Whitetail is commonly given at 350 lbs., but I find good testimony for considerably higher.

In 1877, a large buck was shot in Franklin County, Adirondack, N. Y., by John T. Denny, of New York. It weighed 286 lbs. dressed, which would give 357 lbs. live weight.[2]

John W. Titcomb, of the United States Bureau of Fisheries, writes that a buck weighing 370 lbs. was killed in Vermont in 1898.[3]

One that weighed when dressed 299½ lbs., or 375 lbs. live weight, was killed in Essex County, N. Y., by Albert H. Thomas, of Warrensburg, N. Y.[4]

A still larger animal was shot by Warren S. Potter, of Glens Falls, N. Y., shortly before 1896, at Thirteenth Pond, Warren Co., N. Y. It weighed 318 lbs. dressed, which means a live weight of 400 lbs.[5]

The most remarkable Adirondack buck, that I can find authenticated, was killed by Henry Ordway near Mud Lake, in 1890, and is described by James M. Patterson in Col. Fox's Forestry Report, as follows:

"Weight, before being dressed, 388 lbs. [bleeding and drying must have

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[1]W. F. Fox, Rep. Supt. Forests, N. Y., 1st Ann. Rep., N. Y. S. 1896, p. 200.
[2]As above.
[3]Forest & Stream, Jan. 7, 1899, p. 9.
[4]Rep. Forests, N. Y., 1896, p. 200.
[5]As above, p. 201.

robbed it of fully 12 lbs., so that its live weight was about 400 lbs.]; height over withers, 4 ft. 3 in. There are 9 prongs on one antler, and 10 on the other. Length of antlers, 32 in.; distance between antlers, 26½ in.; length from tip of nose to tip of tail, 9 ft. 7 in."[6]

To this, A. N. Cheney adds[7]: "I have talked with Mr. Patterson (who is a brother of ex-District Attorney Patterson, of Warren Co.) since his letter was printed; and he added to the figures given, that the Deer measured 37 inches around the neck back of the head, and that the longest spike on one beam was 13 inches. The buck had been seen on several occasions during two or more years, before it was secured, and a number of sportsmen had made several efforts to kill it. It appeared to have no fear of Dogs that were put on its track, and on one occasion attacked and drove off two."

What seems to be a still heavier is recorded by R. P. Holland, whose account is vouched for by William B. Mershon, the well-known sportsman of Saginaw, Mich., and George A. Newett, editor of the *Iron Ore*, Isheming, Mich., and others. The buck was killed near Trout Lake, Mich., by Albert Tippett, and weighed 354 lbs. after being dressed and brought to the railway.[8] By fair computation, the live weight of this Michigan giant was 425 lbs.—the record weight.

Going southward over the range, we find the Florida Deer. Of this species the bucks are commonly said to be about 80 or 90 lbs.; and, according to Cory,[9] not often over 110 lbs. The does are proportionately less in weight.

Still farther south, we find the Acapulco Deer which Caton considered the smallest of the North American species. None of the specimens he had, weighed over 30 or 40 lbs.[10]

Colour. In its *summer* (or red) coat, this Deer is a soft, reddish tan, or yellowish brown, without peppering; it is darker along the spine, paler on the face and throat, breast, and legs. It is much darker on the upper side of the tail, with a black spot on each side of the chin; the band across the nose, the ring around each eye, the inside of each ear, the patch on the throat, the inside of each leg, the under side of the tail, and the region under the tail and belly are pure white. The white edgings of the metatarsal and interdigital glands are pure white, but contrast very little with the surrounding colours.

In *winter*, blue, or sport coat, the red is replaced by a pepper-and-salt

[6]Rep. Forests, N. Y., 1896, p. 200.
[7]As above, p. 201.
[8]Forest & Stream, May, 1920, p. 30.
[9]Hunting & Fishing in Florida, 1896, p. 63.
[10]Ant. & Deer, p. 121.

gray. Or, in detail: A New Brunswick specimen (A. M. N. H. 42599) is as follows: General colour of the head, neck, and body, warm wood-brown, thickly peppered with black, caused by the middle and top of each hair being blackish; that is, each hair is blackish with a pale buff bar near the top. The face is stained warm brown. The snout, thickly peppered, darkest along the ridge, becoming white around the mouth and around each eye, with a dark brown spot on the end of the snout, and under each nostril. Inside of front legs, belly, the front of each thigh, buttocks, and under side of tail, pure white. On the legs, the peppering gives place to a deep warm brown or sienna. Top of tail, peppered like back, except the tip on the top, which is nearly black. The tarsal gland and the interdigital glands of both feet are surrounded by pure white hair. The mantle, though peppered everywhere, shades into pale sienna brown along each flank, then abruptly ends, giving place to the white. The chest is coloured nearly like the back.

The sexes are alike in colour.

The young are bright bay or dull reddish yellow, spotted with pure white; but lose this coat when about 4 months old.

There is a tendency to albinism among the Deer in some parts of the country. This appears usually on islands and in isolated districts, where it seems to be a consequence of inbreeding.

Albinism is a freak or disease by which the colouring matter is left out of the hair on those parts of the body that are affected, and the hair there comes white. Sometimes the entire animal is involved, in which case usually the hoofs are white and the eyes pink. It is not by any means certain that the albino of this year will be an albino of next year also. The affection is sometimes associated with internal worms.

Announcements of albino or partial albino Whitetails are frequently made. There are two nearly perfect albinos of this species in the American Museum.

On Grand Island, Lake Superior, George Shiras 3rd has a herd of albino Virginia Deer, fully described and illustrated in *Forest & Stream*, March, 1918, pp. 158–59.

Melanism has not yet been recorded for the species.

Races

The following races have been recognized:

virginianus Boddaert, the typical form, with lower tooth-row of cheek 3 in. long (75 mm.); winter coat not very different from that of summer. T. l., Virginia.

borealis Miller, paler in colour and much larger than *virginianus*. Lower tooth-row of cheek $3\frac{3}{8}$ in. long (85 mm.); winter coat much coarser and grayer than summer coat. T. l., Bucksport, Maine.

macrourus Rafinesque, paler than *virginianus*. T. l., Plains of Kansas River.

leucurus Douglas, with little or no black and much white. T. l., Lower Columbia River, Ore.

texanus Mearns, much smaller and paler than the typical form. T. l., Fort Clark, Kinney Co., Texas.

osceola Bangs, in size like *texanus*, but very dark in colour. T. l., Citronelle, Citrus Co., Florida.

louisianæ G. M. Allen, in size like the typical, but pale, and with heavy skull. T. l., Mer Rouge, Morehouse Parish, La.

couesi Coues & Yarrow, very small and pale with dwarfed horns. T. l., Camp Crittenden, Pima Co., Ariz.

clavium Barbour & G. M. Allen, smallest of the eastern races, paler and smaller than *osceola*. T. l., Big Pine Key, Monroe Co., Fla.

Besides these, are numerous Whitetail relatives in Mexico and Central America; but they have not been studied as a group, and are best omitted, since apparently none of them are found north of the Mexican border.

The sportsman-hunter pays little heed to the colours and fine distinctions which are so important to the scientist. He usually lumps the twenty-odd species and races of small American Deer, as "Deer," and carries a general impression of a deer-coloured animal, paler on the under parts. This is a true impression as far as it goes; indeed, I know of no colour feature on the animal's trunk by means of which the various species may always be distinguished. Nevertheless, nature has added a label to each, and, as though by kindly plan, this is the last part of the animal that the hunter sees as it disappears in the woods. The tail and disk are totally different in each species. If every sportsman would bring the tail of his Deer (or failing that, make a sketch of it), with a note of its length, and the locality where he found it, we could tell with fair certainty the species he had got or seen.

History

One Thomas Hariot, an English mathematician in the service of Sir Walter Raleigh, visited Virginia in 1584. In his account of the colony, he says:

"Of Beastes. *Deare*, in some places there are great store: neere unto the sea-coast, they are of the ordinarie bignes as ours in England, and some lesse: but further vp into the countrye where there is better feed, they are greater: they differ from ours onely in this, their tailes are longer, and the snags of their hornes looke backward."[11]

There is no doubt that Cartier saw the Whitetail at Montreal in 1535; but Master Hariot, the mathematician, has given us the first identifiable description of the species. It is therefore with reason called the "Virginian Deer."

Anatomy

While the horns are distinctive in type, they are of less importance than the tail and the leg glands as characteristics of this Deer. The illustration on the Plate sets forth these sufficiently in comparison with the related species.

The leg glands are more important because more constant. Of these, Judge Caton says:

"The longer and the more minutely I have examined this glandular system on the hind legs of the different species of this genus, the more I have become impressed with its importance in the division into or identification of species. As Doctor Gray justly remarked, they are not transient, or exceptional, like the antlers, but are present on both sexes and at all ages; and had he studied them with care, he would have added that they are as near alike as possible on each individual of each species, and that those on the outside of the legs, when present, are entirely unlike on the different species; so that upon an examination of the part of the skin containing this gland, no one familiar with the subject could hesitate to declare with certainty from which species it came.

"Hardly any other single mark pervading so many species is so reliable as this, and certainly none of so small dimensions."[12]

Freak Foot

The feet are much less subject to aberration than the horns; but Dr. E. Coues has described[13] a solid-hoofed Virginian Deer that was sent him by George A. Boardman, of Calais, Me. In this freak, the two central or main hoofs were consolidated as one. A somewhat similar peculiarity has often been seen in Pigs, but never before recorded for the Whitetailed Deer.

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[11]Virginia, 1585–86; Quaritch Reprint, 1893, p. 29.

[12]Ant. & Deer, p. 266.

[13]Bull. U. S. Geol. Surv., Notes Herpet. Dak. Mont., Feb. 5, 1878, Art. XII, pp. 293–94.

PLATE XLVII.—VARIOUS WHITETAIL IN THE SNOW, YELLOWSTONE

Photographs by E. T. Seton

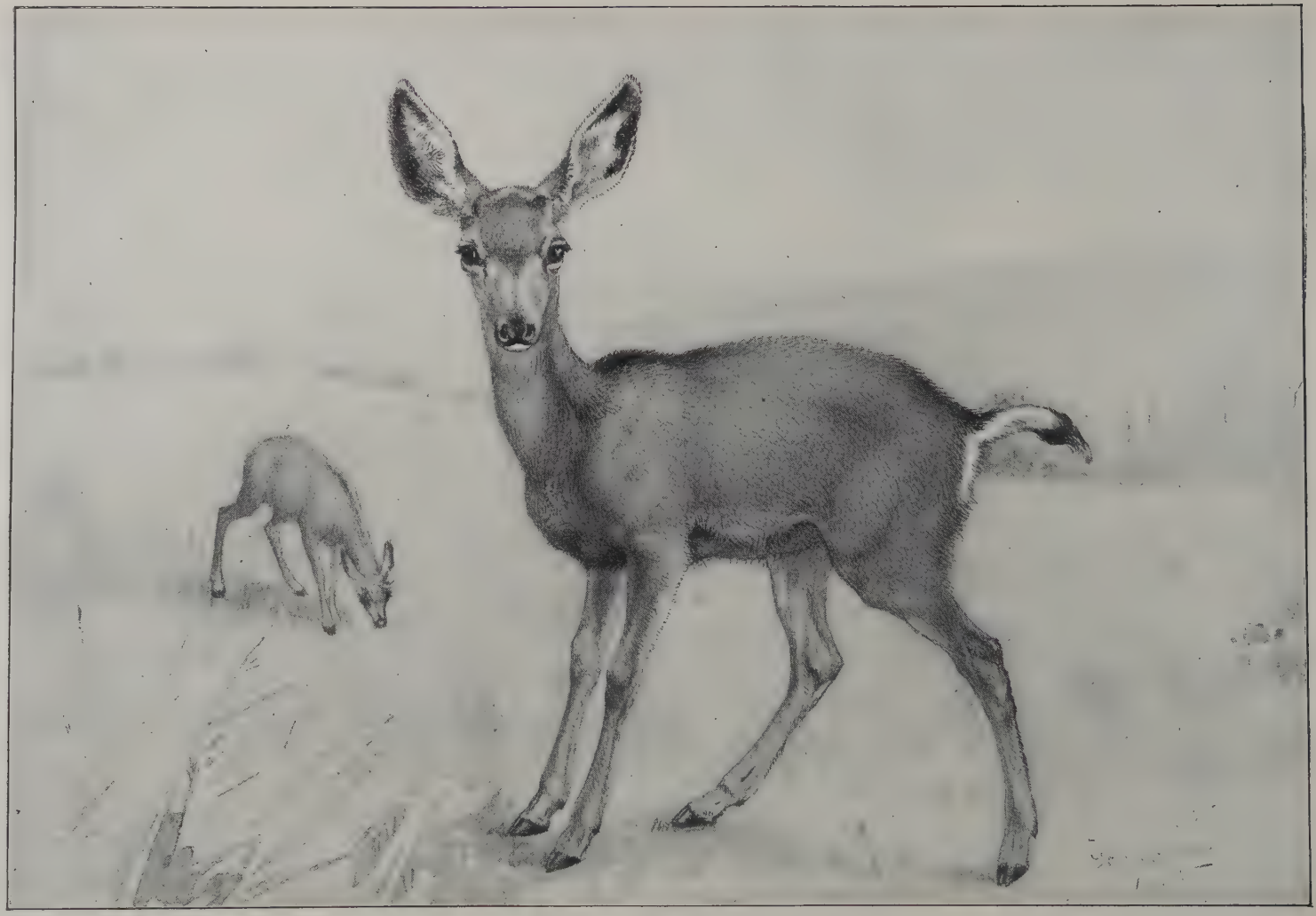

PLATE L.—MULE-DEER FAWN

J. B. Burnham writes that "Warren W. Cole, of Long Lake, saw a Deer killed by Orin Lapelle at Flatfish Lake, Hamilton Co., N. Y., that had 5 legs. The superfluous member started from the gambrel joint of the right hind leg and terminated in a perfect hoof."[14]

Antlers

In the genus *Odocoileus*, there are two well-marked types of antlers, as shown in the Plate. These represent average horns of full-grown bucks. In general style, the Coast Deer antlers resemble those of the Mule-deer, but are more slender. Those grown by a Whitetail buck are normally as shown in the Plate, but antlers are usually *abnormal*. J. W. Titcomb states[15] that a tame Deer which he knew, grew, on its second autumn, a pair (its first) that were a foot long, and had three points on each.

A pair with many snags *probably* belonged to an old buck, and yet again an old buck may have mere spikes. Thus it will be seen that any one pretending to tell the age by the horns alone is sure to err.

The longest antlers entered in Rowland Ward's Book[16] is the J. C. Phillips head from Michigan. It is given (owner's measurements) as: Length, $32\frac{1}{4}$ in.; girth, 6 in.; tip to tip, 8 in.; widest inside, $20\frac{1}{4}$ in.; points, 17+15.

Next on the record (not Ward's) are those of the Ordway buck already described: Length, 32 in.; spread, $26\frac{1}{2}$ in.; points, 9+10.

What was for long the world's record for antlers of the Whitetail was secured by Henry A. Caesar of New York, in Maine during the season of 1910. It has been surpassed in length, but not in certain other features. It is massive, symmetrical, and typical, unspoiled by mere freakisms, and by some may yet be given first place. It measures: Length of beam, 29 in.; girth, 6 in.; widest outside spread, $27\frac{3}{4}$ in.; points, 18+24 (see Plate). It is now to be seen in the National Collection of Heads and Horns at Bronx Park, N. Y.[17]

The R. Gilfort head is given by him as follows: Length of right beam, $30\frac{1}{2}$ in.; of left, $29\frac{1}{2}$ in.; girth, 2 in. from base, $7\frac{1}{8}$ and 7 in.; spread between points, $19\frac{1}{2}$ in.; widest spread, $28\frac{3}{4}$ in.; number of points, 13+12.[18]

Of those measured by himself, Rowland Ward gives the first place to

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[14]Forest & Stream, March 25, 1899, p. 224.
[15]McKinley, History of a Vermont Deer, Forest & Stream, May 18, 1899, p. 205.
[16]Records of Big Game, 1922, p. 94.
[17]Zool. Soc. Bull., Sept., 1911, p. 792.
[18]Recreation, Nov., 1898, p. 381.

the head owned by Sir Edmund G. Loder. It is as follows: Length, 30 in.; girth, $5\frac{3}{4}$ in.; tip to tip, $9\frac{5}{8}$ in.; widest inside, $19\frac{3}{8}$ in.; points, 9+9.

In Centre Co., Pa., in 1910, W. P. Rhines secured a remarkable head. It is as follows: Length, 29 in.; girth, 6 in.; spread, 22 in.; points, 28 in.[19]

The Dr. H. M. Beck head is given third place (owner's measurements) in Rowland Ward's book. It is from Michigan and is as follows: Length, 28 in.; girth, $6\frac{3}{4}$ in.; widest inside, $29\frac{1}{4}$ in.; points, 40.

Rowland Ward lists 8 heads of which the beam is 27 in. or more in length.

Some of the most remarkable variations are here shown. The record for points still rests with a pair owned by Albert Friedrich, of San Antonio, Texas, which are of such superabundant vigour as to have 78 points (see Plate). The 42-pointer from the Adirondacks and the 35-pointer from Minnesota claimed record places for a time.

Antlers are sexual appendages, and their connection with the genital system is close, though obscure. The latter cannot be deranged without creating a disturbance in antler production, and the effect of emasculation is extraordinary. Judge Caton, to whom we are so much indebted for light on the Deer family, shows[20] that a buck castrated when his antlers are nearly grown, will drop them within thirty days after. Next year, he will grow a new pair, according to rule; but they never ripen, harden, nor peel. They continue full of blood and life until they are frozen and broken off by accident, leaving a stump. Each year thereafter, the stump grows larger and a new antler is projected, but never finished; and each succeeding year, the antler will be smaller and more irregular.

Antlered Does

From time to time, does are found wearing antlers, usually spikehorns, and in the velvet. J. B. Burnham writes:

"E. J. Chase, of Newcomb, N. Y., killed a horned doe near the Adirondack Upper Works, 8 or 9 years ago. The horns were spikes 6 or 8 in. in length. The animal was a young doe and had never bred. Fayette Moody, Saranac Lake, killed a horned doe with 3 prongs on each antler."[21]

As the connection between the reproductive organs and the horns is so close, Caton suggests[22] that probably the females wearing these masculine ornaments have some peculiarity in the genitalia.

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[19]Field & Stream, March, 1917, p. 402.

[20]Ant. & Deer, pp. 186–87.

[21]Forest & Stream, March 25, 1899, p. 224.

[22]Ant. & Deer, p. 233.

Less interesting freaks are hornless adult bucks. I have never seen one, but have often heard of them, and find several cases recorded.[23]

Locked Antlers

Hariot first called attention to the unique fact that the "snags" of the horns "look backward." Caton points out[24] that "this enables the animal, by bowing his head in battle, as is his habit, to present the tines to the adversary in front. When two meet in the shock of battle, thus armed these antlers form so complete a shield that I have never known a point to reach an adversary."

But the peculiarity has an offsetting disadvantage. More in this species than in any other in America do we find cases of fatally interlocked antlers—cases in which two bucks struggling for the mastery, have, in some way, either sprung their antlers apart, or forced them together so that they are hopelessly intertangled; and death to both combatants is the inevitable finish. Often it comes by starvation, so that antler-bound bucks are lucky if found by their natural enemies, and put to a speedier and less painful death.

Stanley Waterloo writes:[25] "In November, 1895, Mr. F. F. Strong, a well-known Chicago business man and an ardent sportsman, was, with a small party of friends, hunting near Indian River, in Schoolcraft Co., Michigan. One day, when the party was out, ravens were noticed hovering noisily over a certain spot, and, attracted by curiosity, the hunters sought the cause. Emerging into a comparatively open space in the wood, they made a discovery. For the space of nearly an acre, the ground was torn and furrowed by the hoofs of two bucks, and near the centre of the open space lay the bucks themselves, with their horns inextricably locked (see Plate). One of the Deer was dead, and the hungry ravens had already eaten both his eyes, though deterred from further feasting by the occasional spasmodic movements of the surviving combatant, whose eyes were already glazing."

In *Recreation* for Oct., 1898, p. 280, W. L. Winegar of Egin, Idaho, offers the following: "My brother, while out hunting, at that time [1883], saw a large buck in some sage brush. He noticed it walked backward, and appeared to be dragging something. He shot the animal and found its horns locked in those of a smaller Deer. The latter was dead and partly devoured by Coyotes. The living buck was so poor as to be unfit

[23]Forest & Stream, July 4, 1896, p. 5; and June 6, 1896, p. 454.

[24]Ant. & Deer, p. 224.

[25]Recreation, Sept., 1897, pp. 236–37.

for food. My brother brought the heads home. Many people here remember seeing them."

I remember reading an account of a hunter finding two bucks thus locked—one dead, the other near death. He was a humane man, so went home for a saw, and cut the living one free. The moment it felt at liberty, it turned its feeble remaining strength on its deliverer; and he had much ado to save his own life before he could regain his rifle and lay the ingrate low. (I am unable now to find the record.)

Bachman tells[26] of three bucks whose antlers were thus interlocked.

A similar episode is set forth in the *Family Herald & Weekly Star* of Montreal, for Wed., Oct. 12, 1910, as follows: "An Indian from the Flambeau reservation in northern Wisconsin once came into a fishing resort of Squaw Lake with a curiosity in the way of Deer horns that he wished to sell. This consisted of three sets of antlers inextricably interlocked. Two sets of antlers so locked are rare, but not unknown. It is believed that the Flambeau Chippeway had the only set of three-locked antlers in the world."

A still more extraordinary affair is reported in the Milwaukee *Free Press*, Nov. 21, 1901: "Antigo, Wis., Nov. 20.—While Nat Wahleithner of the town of Elton, 25 miles east of Antigo, was hunting yesterday, he came upon two large 6-year-old Deer with horns interlocked around a 5-inch sapling, where they were made fast. The Deer were utterly exhausted, having apparently been fast for a couple of days. The horns were so tightly locked together that two men could not pull them apart."

Locked antlers are so very common among Elk and Virginia Deer that I believe 1 per cent. of the bucks lose their lives from this cause.

In the New York State Museum is shown a portion of a tree with the antler of a Deer driven through it; or, more likely, an antler with the tree grown around it.

Range

The map sets forth the main outlines of the Whitetail's range; but, of necessity, omits details such as the absence of Deer from extensive bogs, open plains, rugged mountains, and wide marshes, as well as the fact that the species congregate in great numbers among the belts of nut-bearing trees.

It further illustrates an interesting fact in Whitetail distribution: that while the species has lost much territory in the East and in the centre of its range, it has gained a great deal in the North and West. The reason

[26] Q. N. A., II, p. 224.

MAP IV.—RANGE OF THE WHITETAILS

By E. T. Seton, with assistance of the Biological Survey

Range of the Virginia Whitetailed Deer: The extension into Utah is recent and due to irrigation. In the central third of this, it is practically extinct.

Range of the Arizona Whitetail (*couesi*) and its southern relatives.

for this will be seen in its habits, especially in its adaptability to agricultural conditions; also, no doubt, to the extermination of Wolves in most of the region. That is, the Whitetail has accompanied the settler as the forest was opened up.

The following pertinent records illustrate the spread of the species:

Manitoba. It was unknown about Pembina, if we may judge by its continual omission from the yearly reports of Alex. Henry. In 1820, it had not yet appeared. When, in 1874, Dr. E. Coues explored the Pembina region, it was still without Whitetail. The earliest accounts I can find are for 1881, about which time, according to many old Manitobans, the "Down-East Deer" first made its appearance on the Red River. Up to 1884, it was still unknown at Carberry, though common at Pembina.

From that time, the creature has spread steadily, as shown by the map; so that now the Whitetail is the predominant Deer of southern, that is, Alleghanian, Manitoba.

Ontario. This Deer was always found in northeastern Minnesota; but has spread since 1900 eastward and northward toward Port Arthur, where it is now common. The local hunters assure me that, though not formerly found on the north shore of Lake Superior, the Whitetail is now general in that region, and increasing, especially around Sault Ste. Marie.

Northward, it has extended its range as far as latitude 50° at least, in Algoma, and is likely to continue advancing till it reaches Hudson Bay.

Quebec. In the country 40 miles north of Deux Rivières on the Ottawa, my Indian and half-breed guides stated in 1905 that the Whitetail had never been abundant there; but was more so at that time than ever before. This is near the north limit.

Anticosti. The species was not native to Anticosti Island, but has recently been introduced by Seigneur Meunier, and I am informed by Maxwell Graham, of the Wild Life Dept. at Ottawa, that they are doing exceedingly well.

Gaspé, Que. On the north coast of Gaspé, G. G. Goodwin found the Whitetail scarce, but accounted for this by the recent forest fires. Otherwise, it is of general distribution now.[27]

New Brunswick. In 1892, Montagu Chamberlain wrote: "Uncommon, though increasing. This Deer was formerly restricted to the valley of the Magaguadavic; but has lately spread into other portions of Charlotte and York counties, and a few have been taken in Carleton and Victoria. There is no record of any having been observed east of the St. John River. Doctor Gesner states that this species was first seen in New Brunswick in

[27]Mamm. Que., Journ. Mamm., Nov., 1924, p. 257.

1818, the same year in which the Wolf appeared, and that by 1847, it had become plentiful."[28]

According to A. Leith Adams, in New Brunswick: "Localized; few found eastward of St. John; common in the hilly country along the course of the Magaguadavic River."[29]

Nova Scotia. The species was unknown in Nova Scotia when the first settlers came. But about 1890, H. A. P. Smith of Digby, N. S., introduced 13 Whitetails of New Brunswick stock. They are now abundant, and found in every county.

The N. S. Game Commission report (p. 8) is as follows for 1913: "The Deer continue to increase in numbers. Out of 42 wardens' reports, from 12 counties, 2 only report a decrease. The other 40 report an increase. No reports have been received from Pictou or Antigonish, but Deer are found in those counties, and probably are increasing in both. No Deer have as yet been placed on the Island of Cape Breton."

Oregon. Stanley G. Jewett calls my attention to the fact that Whitetail Deer of the form *leucurus* are found in western central Oregon, citing Willamette Valley, North Umpqua River, and Davis Lake region. He considers them the last remnants of the species, which he holds to be distinct from *virginianus*.[30]

Primitive Numbers

In speaking of Whitetail, the early travellers use expressions that tell of astounding numbers. Thus Cartier's "great store of Wilde beasts as Faunes, Stags, etc."[13]; Hariot's "great store."[32] Morton, writing of New England and its Deer (1632), says:[33] "There are in the country 3 kinds of Deare, of which there are great plenty, and those are very useful."

Just what these writers meant by "great plenty," I have endeavoured to ascertain.

"Although," says Captain Marcy, "the Deer are still abundant in many of our forest districts in the east, and do not appear to decrease very rapidly, yet there has within a few years been a very evident diminution in the numbers of those frequenting our western prairies. In passing through southern Texas in 1846, thousands of Deer were met with daily, and, astonishing as it

[28]Mamm. New Brunswick, Bull. Nat. Hist. Soc. N. B. No. X, 1892, pp. 31–32.
[29]Field & Forest Rambles, 1873, p. 296.
[30]Oregon Sportsman, Aug., 1914, pp. 5 and 7.
[31]Hakluyt's Voyages, III, pp. 231–9.
[32]Virginia, Quaritch Reprint, 1893, p. 29.
[33]T. Morton, New English Canaan, London, 1632.

may appear, it was no uncommon spectacle to see from 100 to 200 in a single herd; the prairies seemed literally alive with them."[34]

Henry Howe, in his "Historical Collections of Ohio,"[35] gives the details of a single day's hunt in the township of Medina, Ohio, on Dec. 24, 1818. The township was 5 by 5 miles, that is, 25 square miles. He says: "The accurate enumeration of the game killed at the centre [of the drive] resulted as follows: 17 Wolves, 21 Bears, 300 Deer, besides turkeys, Coons, and Foxes not counted."

This was at the rate of 12 Deer to the square mile, supposing that the hunters got them all, which is impossible. There might easily have been 20 Deer to the square mile in the region.

As a sidelight, we learn from George Shiras 3rd that his family stocked Grand Isle, Lake Superior, with game. The island is 14,000 acres, less than 22 square miles. In 1920, this island was supporting 3,000 to 4,000 Whitetailed Deer, as well as 250 Elk, and other game. That is about 160 to the square mile; and this, we know, was far beyond the sustaining power of the range. For they perished in numbers till barely half remained. Even then they needed artificial feeding. Apparently 50 to the square mile would have strained the food supply. The data derived from the Ohio hunt above detailed, seems to imply that 20 to the square mile is a high though possible rate of population in the most favourable parts of the Whitetail range.

This range, 2,000,000 square miles, may, according to this, have had 40,000,000 Deer.

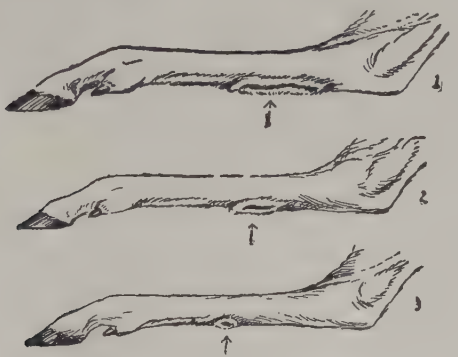
In the season of 1895, the official returns[36] showed that 4,900 Deer were killed in the Adirondacks. It is notorious that official returns are far below the actual slaughter; for we must add, further, the number of those killed illegally during or out of season, as well as those killed and not found; also a proportion destroyed by natural enemies. We may believe that 4,900 Deer reported, means at least 6,000 or 7,000 actually killed.

I have heard hunters estimate that, under the most favourable circumstances, the Deer do not add more than a quarter each year by actual increase. If, therefore, more than a quarter are killed in a season, a falling-off results. But the Adirondack Deer are holding their own; that is, those killed are less than a quarter of their numbers. I should, therefore, estimate them at 30,000, or, roughly, 3 to a square mile.

The official report for Maine gives 7,579 Deer killed in 1899, which we

[34] Prairie Traveller, 1859, Capt. R. B. Marcy, p. 239.
[35] 1874, Vol. II, pp. 463 to 467 inclusive.
[36] 1st Ann. Rep., N. Y. S., p. 192.

The tails and discs of: 1. New England Whitetail. 2. Colorado Mule-deer. 3. Oregon Coast Deer. 4. Wyoming Wapiti. 5. British Red-deer



Left hind leg of: 1. Mule-deer; 2. Coast Deer; 3. Whitetail; to show the size of the metatarsal glands, respectively, 5, 2, and 1 inch long

PLATE XXXIX.—DETAILS OF WHITETAIL

may believe makes a destruction of about 15,000 Deer. But they have ample room, and are steadily increasing, so that I put the numbers existing in Maine to-day (1906) at not less than 75,000, or about 2 to the square mile. In doing so, I find I have been properly conservative, as Dr. W. T. Hornaday, in 1904, gives[37] the estimate of Deer in Maine at 100,000, or 3 to the square mile.

All records agree, however, that in numbers, the Deer in the Adirondacks and Maine now are as nothing to those of days gone by. Thus Morton says[38] of those in New England about 1632: "There is such abundance that 100 have been found, at the spring of the year, within the compass of a mile."

But even this, we learn from the accounts of innumerable travellers, was far surpassed by the incredible hosts of the Middle States east of the Mississippi and of Texas. In the last-named State, about 1850, I am assured by many old hunters that 500 in one band were met with commonly in the half-open country. Thousands could sometimes be seen in a day; they were there in tens of thousands.

In the mountains of Colorado, I have seen Mule-deer so plentiful that 10 to the square mile would have been a very low estimate indeed, and 20 would be a safe rate for the region. The guides claimed that in favourite localities there were as many as 200 Deer to the square mile.

But the accounts of the hunters put the Whitetail, in point of numbers, far in advance of all other small Deer. Therefore, I feel satisfied that in primitive times, 20 to the square mile is a safe estimate of Whitetail population in its favourable regions—the immediate Mississippi Valley and the country to the east of it. This area was roughly 2,000,000 square miles. That is to say, it was the home of not less than 40,000,000 Whitetailed Deer. This I offer as a very conservative estimate of the Whitetail population in primitive times.

The Slaughter

We have already heard of 300 Deer slaughtered in one day at Medina, Ohio, in 1818, apparently for the pleasure of killing. Such drives were a feature of the times.

J. R. Simms in his "Trappers of New York," 1850, relates that "Thomas Meacham of the town of Hopkinton, St. Lawrence Co., N. Y., died a few weeks ago, according to the St. Lawrence *Republican* of Jan., 1850. He kept an exact account of the game killed by him, which amounts to the following: Number of Wolves, 214; Panthers, 77; Bears, 219; Deer, 2,550"

[37] Am. Nat. Hist., 1904, p. 131.

[38] New English Canaan, 1632.

(p. 271). On another page (p. 176), he tells of Nathaniel Foster, who settled in Herkimer Co., N. Y., because of its abundant game. Foster is believed to have killed more game than any other man in the State in the same period; viz.: "76 Deer in one season; 96 Bears in 3 seasons; 25 Wolves in one year."

There were not only thousands—there were tens of thousands of these wicked butchers. Can we wonder that the game disappeared?

Restoration

An exact map of the Deer range in 1890 would give a much smaller area than to-day. This black 1890 was the low-ebb year for nearly all kinds of big game, east of the Mississippi. Since then, organized efforts at restocking have been made in many States, with encouraging results. In 1890, the Whitetail was virtually exterminated in New England, outside of Maine.

From *New Hampshire*, W. E. Cram writes me (Feb. 26, 1925): "Thirty years ago, the rumour of a Wildcat or a Deer being seen anywhere in southern New Hampshire was hooted at; now both species are common enough wherever there are woods enough for their protection."

From *Vermont*, Harry Chase writes:[39] "In his biennial report of 1906, Commissioner Thomas said: 'Previous to 1878, to see a Deer in Vermont was certainly a rarity, and if one was seen, it was of so much importance it was published by the press throughout the State. On April 27, 1898, a herd of 10 Deer, and on the 5th of May following 3 more, and about the same date 4 more were liberated in Rutland and Bennington counties. The first 10 were purchased from the keepers of the New York State prison at Dannemora. Seven were purchased from other sources or donated.'"

"In 1920," says Dr. W. H. Osgood, "over 4,000 Deer were legally killed in Vermont, whereas 25 years ago, scarcely a one could be found."[40]

In *Connecticut*, from 0 in 1890, the enforcement of wise restoration laws has raised the Deer population to an estimated 3,000 in 1926. In every part of the State they are now found, even into the town of Greenwich.

In *New York* State, the Deer were found only in the Adirondacks in the Dark Time of 1890. Now they are found, in some degree, throughout the State. Individuals have been seen even in Yonkers and White Plains. If Dogs were under proper restraint, we could easily have as many Deer as are compatible with other interests.

The N. Y. Game Commission reports in 1923, as follows: "While there is

[39]Forest & Stream, July 31, 1909, p. 174.

[40]Whitetailed Deer, Field Museum, 1922, p. 10.

no accurate way of determining the Deer population of the State, it is commonly believed to be about 50,000 animals. During the year that the taking of bucks and does was permitted, the estimates of the Deer taken that year ranged from 12,000 to 20,000 animals. Investigations carried on by the Commission through various channels lead it to believe the latter figures are nearer the true ones. This law remained on the statute books but one year, being repealed the following. It is now believed that the number of Deer taken yearly ranges somewhere between 7,000 and 12,000 animals."[41]

Pennsylvania. But the outstanding case of successful restoration is that of Pennsylvania. A brief presentation of the effort and its results may be made by extracts from the Report of Seth E. Gordon, Secretary to Game Commission of the State.

"Twenty years ago, a live Deer in the Keystone State was a curiosity. All game was gone."

Wise men evolved a plan of State hunting grounds in each of which was a sanctuary or region where the Deer were always safe. "The first State Game Refuge was created in Clinton County during the fall of 1905, where some fine game cover, containing slightly over 2,500 acres, was set aside."

"In 1907, only 200 Deer were killed in all of Pennsylvania."

"There are now scattered throughout Pennsylvania, 32 regular game refuges, with keepers in charge, containing almost 75,000 acres and 1,100,000 acres of State-owned land surrounding the refuges for public hunting grounds. Present plans are to increase this State-owned land to at least 5,000,000 acres, with many more refuges to be established as fast as lands are available. . . .

"A refuge established in 1907, in what is known as the South Mountains south of Chambersburg, was stocked with 25 Deer. There were practically no native Deer left, only 4 being killed in all that surrounding territory the year before.

"During the 1923 open season, over 650 legal buck Deer were killed in the territory fed from that refuge, and does are so plentiful that herds of from 40 to 60 Deer are not uncommon sights in nearby fields. More than 100 Deer will be trapped from this one refuge this winter for stocking elsewhere. . . .

"By 1923, the total number of contributors (at $1 a year) numbered almost 500,000 residents, and 2,328 non-residents. Since there are about 100,000 landowners and their families (honorary stockholders, who hunt

[41] Ann. Rep. Conservation Comm., for 1923, State of N. Y., 1924, p. 81.

legally without contributing), the Keystone State now has in round figures 600,000 hunters; or, on an area of 45,000 square miles with a population of 9,000,000 people, she now furnishes sport for about $\frac{1}{10}$ of the hunters in the United States. . . .

"The total bag in 1923 being 6,452 legal bucks."[42]

And still the Deer, as well as other game, are increasing.

Although the map of to-day shows a wide distribution, the distribution is on a very different basis from that of 200 years ago. The Adirondacks, northern New England, northern Michigan, northeastern Texas, and the dry parts of Florida (aggregating 100,000 square miles) may yet show an average of 3 Deer to the square mile. But we must consider the species as practically absent now from Ohio, Indiana, Illinois, Iowa, Nebraska, Kansas, Kentucky, the northern half of Missouri, and the southern halves of Minnesota, Wisconsin, Michigan, New York, and Ontario, a total area of about 600,000 square miles of their best country.

Conditions To-day

In *Anticosti*, recently introduced; now numbering 300 or 400.

In *Nova Scotia*, introduced; now abundant and found in every county.

In *New Brunswick*, found throughout the western half of the Province, and steadily increasing. In 1913, 3,000 were killed, which implies a stock of 15,000.[43]

In *Ontario*, the Official Report for 1908, gives 4,387 as the number of Deer carcasses brought out; but claims that the actual kill is 3 times as great—about 12,000. This drain they stand; therefore, the stock must be 60,000.[44]

In *Maine*, during 1913, 7,755 were legally killed[45] implying a stock of 40,000.

In *New Hampshire*, in 1919, nearly 5,000 were killed.[46]

In *Massachusetts*, during 1913, 1,596 were killed,[47] implying a stock of 8,000.

In 1920, 4,440 Deer were legally killed in *Vermont*,[48] whereas in 1898, the total kill was 130.[49]

[42] Field and Stream, Jan., 1925.
[43] Forest & Stream, July 25, 1914, p. 130.
[44] Forest & Stream, July 24, 1909, p. 134.
[45] As above.
[46] As above.
[47] As above.
[48] Field & Stream, July, 1921, p. 295.
[49] Forest & Stream, Dec. 17, 1898.

In *Wisconsin*, according to R. S. Scheibel, Secretary of the State Conservation Commission, "we feel safe in saying that 15,000 Deer were killed in Wisconsin in the fall of 1916."[50]

In *Pennsylvania*, the number of Deer killed in 1919 was 3,239.[51]

Deer legally killed in *New York* State in 1918 was 8,293.

In *New Jersey* during 1918, 365 were killed.[52]

"In Minnesota, in 1919, both bucks and does were killed to the tremendous total of 18,572."[53]

According to F. G. G., 5,500 Deer were killed in Louisiana, during the season of 1908.[54] Director Stanley C. Arthur, of the Division of Wild Life, Louisiana, tells me that there are at least 25,000 Deer in his State to-day (1926).

"In 17 States east of the Mississippi River, an estimate of the number of Deer killed in 1919 was 60,150."[55]

Since the wild herds not only bear the above drain, but increase under it, we must believe that less than 20 per cent. are taken each year. Therefore, we have at least 300,000 Deer left in the United States, east of the Mississippi. This, being about half of the range of the species, implies 600,000 Whitetails, to which we must add at least 100,000 for Canada.

"An estimate of the total number of Deer killed throughout the United States in 1910, gave 75,000 to 80,000, and a similar estimate in 1915 showed about 75,000."[56] This would imply a population of at least 400,000, as they are increasing.

According to the official census, the total of Deer in the National Forests for the year 1922 was 440,814. The area is about 250,000 square miles. This gives less than 2 Deer to the square mile.

The editor of the Detroit *Daily Times*, in the issue for Dec. 22, 1920, publishes the following statement of the Deer legally taken in the United States during the fall of 1920:

"Here are the statistics on the Deer killed in the States that compiled records: Wisconsin, 26,000; Minnesota, 20,000; Michigan, 18,000; Wyoming, 16,166; California, 13,000; Montana, 7,500; Maine, 5,748; New York, 5,061; Oregon, 5,000; New Hampshire, 4,800; Vermont, 4,100; Pennsylvania,

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[50]Forest & Stream, July, 1917, p. 330.
[51]Game as National Resource, Palmer, 1922, p. 20.
[52]Field & Stream, Aug., 1919, p. 396.
[53]Whitetailed Deer, W. H. Osgood, Field Museum Leaflet, No. 1, 1922, p. 11.
[54]Forest & Stream, July 3, 1909, p. 14.
[55]Osgood, as above.
[56]T. S. Palmer, Game as a Nat. Resource, Dept. Agri. Bull. 1049, 1922, p. 3.

2,913; Idaho, 2,230; Colorado, 1,000; Massachusetts, 833; New Jersey, 522; South Dakota, 225. Total, 133,098."

But those from California and Oregon were practically all Blacktail with a few Mule-deer. Those from Montana, Wyoming, Idaho, Colorado, and South Dakota were chiefly Mule-deer—a total of 45,121 from 10 States producing Whitetails. Rhode Island and the mid-west (Ohio, Kentucky, Indiana, Illinois, Iowa, Missouri, Nebraska, Kansas) are practically without the species, but Connecticut, Maryland, Dixieland, and the Southwest (18 States) are well supplied. So that the 89,977 above listed as legally killed is easily doubled—say, 180,000, killed in the United States in 1920.

Add to this, the estimated kill in Canada of 20,000—a total of 200,000 legal kill; which, since they are not diminishing, easily presupposes a population of 1,000,000 wild Whitetails in 1920. (My estimate in 1908 was 500,000.)

Rate of Increase

"Early in 1900, a pet doe heavy with fawn, was delivered at the Taney County, Mo., game preserve belonging to the St. Louis Park and Agricultural Company. The doe had been thoroughly domesticated, and, refusing to join the wild Deer in the preserve, remained near the home of the tenant and under the immediate care of his family. In the spring of 1900, she gave birth to 2 fawns, both does, which became as gentle as the mother. In the spring of 1901, the old doe again dropped 2 fawns. In 1902, there was an increase of 4 fawns, each of the young of 1900 having given birth to a fawn. By the spring of 1905, the domestic herd had increased to 25 Deer, all the increase of one pet doe."[57]

"Deer, when rightly handled, are very prolific, and from 50 does one can count on 75 fawns."[58]

George Shiras 3rd writes:[59] "It has been scientifically determined that one female Whitetailed Deer and her offspring in a 10-year period, will produce 130 animals, and that two dozen does will have 3,000 descendants in the same period. . . .

"On Grand Island, on the south shore of Lake Superior . . . many years ago some 14,000 acres were turned into a game refuge. Starting with several hundred native Whitetailed Deer, a dozen imported Elk, and a few Moose, the Deer soon increased to over 3,000, the Elk to 250, and the Moose to a lesser number. Finally, the Elk began dying of starvation, and in 3 years they disappeared, and the Moose likewise."

[57] 2d Ann. Rept. Mo. Game & Fish Warden, 1907, p. 20, quoted by Lantz, Raising Deer, p. 45.
[58] Deer Farming, p. 16.
[59] American Forestry, Nov., 1923, pp. 670–71.

In each of the above cases, the Deer were protected and, in hard weather, fed. Conditions more normal prevailed in a case cited to me by Senator Lafayette Young of Des Moines, Iowa. He told me that William Cuppy of Cuppy's Grove, in the east edge of Pottawattomie Co., Iowa, died about 1906, and left as a part of his estate 8 common Whitetail Deer in an enclosure of about 5 acres. The administrators were not permitted by law to kill or sell the Deer, so turned them out to avoid the expense of feeding, etc. It was level, open country with brushy spots, and a little timber along the creeks. The farmers protected them, and they increased in number until now, after 9 years, they are about 1,000. They are not scattered, but stick closely to the original region, though some are now found in Shelly Co. No one molests them, although they are a nuisance on fall wheat.

But this also is in a protected region, whence all their big natural enemies have been driven. Observations in country like Ontario, northern Maine, etc., all force us to the conclusion that, given abundance of food, Deer may add 25 per cent. per annum to their numbers. But, ordinarily, a drain of 20 per cent. is all the species can stand; if more than this, they diminish.

Home Range

How large is the home locality of a Whitetail? Smaller, probably, than that of any other of the Deer family in America. A Moose or a Mule-deer may pass the whole of a summer on a square mile. According to Audubon and Bachman,[60] a Whitetail "is usually found in the same range or drive, as it is called, and often not 50 yards from the place where it was started before." These same naturalists remark with surprise on their finding a band of Deer that bedded at one place, and fed nightly at another "nearly 2 miles off"; and on a third case of Deer that daily covered 4 or 5 miles between bed and board. These, however, are very exceptional.

All the guides that I have consulted, agree with me in giving the individual Whitetail a very limited range. In the Rockies, I know that 200 or 300 acres will often provide a sufficient homeland for a whole family of them the year round.

In 1895, "Julian" wrote: "Deer in Michigan are known as local Deer and migratory Deer. The local Deer are those that remain in a certain neighbourhood the entire year, and the migratory Deer are those that are simply passing through a certain section, either in the fall going south or in the spring going north. The residents of a country frequented by Deer

[60] Q. N. A., II, p. 222.

Typical antlers of Whitetail specimen from Muskoka, Ont.

Collection of Dr. Wm. Brodie of Toronto

The Bonnechère head

From a Topley Studio photograph supplied by Norman H. H. Lett
This is the finest Whitetail set of which I have knowledge

Beam, 26⅛ inches
Spread, 24 inches
Growth above burr, 5⅞ inches.
Points, 24

It was taken on Bonnechère River, Ont., about 1890, by J. Beckett

Michigan head, 1876

Spread, 28 inches
Points, 44

Field & Stream, Nov., 1919, p. 660

Two Whitetail bucks with locked horns

Redrawn from Stanley Waterloo's photograph in *Recreation* for August, 1899

PLATE XL.—VARIOUS ANTLERS OF WHITETAIL

soon learn to distinguish the local Deer from the migratory Deer quite readily. Their habits differ, and their actions differ greatly, in different parts of the country. Deer like their old homes, and will come back to them year after year if the feed is good and they find plenty of timber and water, and they are not driven away by hunting."[61]

To this, Shiras adds, in 1921:

"On the south shore of Lake Superior, including all of northern Michigan and Wisconsin, there once existed a spring and fall movement of the Whitetail Deer which possessed all the characteristics of a true migration. . . .

"Early in May, as soon as the depth of the snow permitted travel, thousands of does worked their way north, travelling alone into a broad belt along the south shore of Lake Superior, where a few weeks later the fawns were born. The bucks came more leisurely, but by early June the migration was over.

"On the coming of the first heavy north winds, accompanied by a light frost, sometimes as early as August 15, the does, fawns and yearlings started south, and by September, thousands were on their way, regardless of the fact that no snow would fall for six weeks, and none deep enough to interfere with the food supply or freedom of movement for more than three months later. . . .

"Doubtless the great depth of snow in this region was the original cause of their fall migration, until it had finally become so fixed by inheritance that long before there was any apparent necessity, the retirement took place."[62]

Why the Deer no longer make this annual trek is not clear.

The attachment of the Deer to their home locality is thus emphasized by C. W. Marsh of DeKalb, Ill., after much experimenting with Deer in parks: "When scared thus, nothing will stop them, and they will either go through or over any fence—they have frequently bounded over mine, $8\frac{1}{2}$ feet high—but when out, they will usually jump back again of their own volition, even though they had been off in the woods or about the park outside for weeks. In such instances, they hung about for a time, seeking an easy entrance apparently (it is useless to try to drive them in), and failing in that they finally jumped over or smashed through the fence. When out, they are very wild, but when they get in, will come up for feed and be as tame and unconcerned as before."[63]

[61]Old Hunters, p. 535.

[62]Nat. Geog. Mag., Aug., 1921, pp. 133–34.

[63]American Field, 1887, quoted by Lantz, Raising Deer, pp. 48–49.

Haunts

The Whitetail is essentially a creature of the woods and thickets, where these alternate with open glades. Bare plains and rugged hillsides are an abomination unto it; but every Western river whose long flood-flat is belted and patched with far-reaching scrubby willows and alders, is sure to carry with it a long-drawn-out population of skulking Whitetails. Here, between scrub and bog, they are able to hold their own and multiply, in spite of rifle and Wolf; while the hill-frequenting Mule-deer is rapidly passing away.

In the hardwood ranges of the East, this preference is less observable, because all of the country is one thicket; but the life of the animal is the same, and its chosen resort is the borderland between sunny open and friendly cover.

In North Carolina, according to N. H. Brimley, the Deer frequent "two entirely different types of territory. These are the mountain region in the western part of the State, and the low-lying lands of the East."[64]

To which, in fuller detail, A. Rutledge adds: "No man, thus following the Whitetail, should neglect to investigate the little brush-bordered ponds that abound in the Southern woods. It is astonishing how Deer love these ponds. When they are bush-grown throughout, the Deer will wade across the water, and bed high up on the hummocks of gallberries and sphagnum moss. Repeatedly, when the broomgrass and the bays would yield nothing, I have killed my buck in one of these ponds.

"And the size of the place appears to have nothing to do with its attractiveness for Deer. Out of a pond no larger than an ordinary room, I have started 5 Deer, and often I have seen stags of the largest sort run out of similar places. If one stag is taken out of such a resort, in a very short time another one will take his place. It is characteristic of Deer to love definite localities; if an old king dies, his throne will not be long vacant."[65]

In one other way, the Whitetail is peculiar: It prefers the edges of civilization. There man wars on its foes, the Wolves; his axe makes sunny openings in the fir gloom; and, above all, his crops furnish delectable food in time of scarcity. In all parts of the North and East, therefore, the Whitetail has followed the settler into the woods, and greatly added to its range thereby. In this, we see the reasons of its extension into Manitoba, northern Ontario, Quebec, and New Brunswick.

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[64]Forest & Stream, Jan. 6, 1912, p. 10.

[65]Forest & Stream, Feb., 1921, p. 56.

Tracks

The tracks that are shown in the Plate were drawn on the sandy shore of Big Dam Lake, 40 miles from Kippewa, Que., Sept. 15, 1905; and show those of the buck, the doe, and the fawn. The tracks of a Pig and of a Sheep are shown in contradiction of the statement that such may easily be mistaken for Deer tracks, even by the expert.

It is well known, that some Deer trail their toes as they walk in 3 or 4 inches of snow. One naturalist suggested that this might be the trail of a weary or wounded Deer, but Harry Chase, the well-known game warden, of Bennington, Vt., writes concerning the creature that made such a trail: "That Deer was not weary, neither was it shot. It was an old buck—that's all. Of course, if the snow was very deep, they would all show the drag; but if it was under a foot deep, you can depend upon it that it was a buck. It is the only true way to tell the track of a buck from a doe in the snow. If it was an old buck, the drag is very pronounced, and draws from one step to the next one; if a 2-year-old, it will not be so marked. Does and yearlings or fawns never show any drag, unless wounded or crippled, or the snow very deep. I have never met but three men who could tell surely a buck's from a doe's track, and they all used this method, and I know it is correct.

"During the past winter, I worked almost daily guarding a big herd of Deer near the Vermont and Massachusetts line. . . . I tested this method hundreds of times, and found it correct in every instance. . . . When the snow was very deep . . . nearly all the Deer dragged their hoofs, but when there was only about an inch of snow, the bucks showed the drag just as plainly; also, the old bucks dragged the strongest, and their toes were inclined to turn out."[66]

W. E., of Roanoke N. C., describing the Deer in his park, says that they "were so tame that his hounds readily distinguished their track from those of wild Deer that occasionally visited the park."[67]

Scats and Beds

The principal sign that serves the hunter, after the track, is the dung. Normally, a Deer makes a dropping about once an hour. This numbers 50 to 100 pellets. If all at one place, the Deer was unalarmed and standing; if scattered along the trail, it was travelling and scared. In winter, if frozen hard, the Deer is an hour or two ahead. If cold but unfrozen, he is half an hour off. If hot and steaming, the Deer is within range.

[66] Letter, April 25th, to Forest & Stream, May 14, 1910, pp. 777–78.

[67] Am. Turf Reg. & Sport Mag., April, 1831.

In winter, the pellets are brownish, hard, and rounded. In summer, owing to the more succulent food, they are often cow-like and confluent. I know of no certain rule to distinguish the pellets of the various Deer.

When a creature such as the Deer adheres long to a given small locality, it soon finds the places that are safe and comfortable in which to sleep. These are usually in a dry thicket, with more or less open land about, so that it can see without being seen. Using these again and again, they become worn into smooth, dusky hollows known to the hunters as "beds." Some are preferred for one wind, some for another. Some are used for day sleep and some for night.

"Julian," discoursing on these, says: "Deer stretch, and stick out their hind legs, and grunt, and wiggle their tails, and leave some droppings usually before leaving their beds, if they are not driven out.

"They take plenty of time to get up and stretch themselves before starting from their beds if undisturbed. The amount of droppings on the edge of a bed will indicate to a certain extent the length of time that the Deer has remained in that particular bed. When a Deer gets up, if he leaves no droppings in the bed, he will be pretty sure to leave some so near the edge of the bed that some of them will roll into the bed."[68]

Thus, the condition of the bed is an exact index to the Deer's state of mind when he left it. This is still more accurately set forth in snow time. If the snow is melted, the Deer was there some hours. If there are two imprints of the animal's body, it rose during the night watchfully, then lay down again. If there is a urine splash at one side, it was a doe; if near the middle, a buck.

Life of the Doe

If we begin in the early spring to follow the life of the Whitetail on its Northern range, we shall find that, up to the month of January, the does and bucks are still in company. According to Bachman,[69] it is only during the mating season that the sexes herd together. This is a general statement which has many exceptions, especially in the North. I think that both males and females are found in the deer-yards throughout the winter, and that young bucks may follow their mothers throughout their first year.

But the melting snow sets all free again. The older bucks go off in twos or threes, leaving the does to go their own way also; which they do in small groups, accompanied by their young of the year before.

[68]Old Hunters, p. 536.
[69]Q. N. A., II, p. 226.

All winter, the herd has fed on twigs, moss, evergreens, and dry grass. Now, the new vegetation affords many changes of nutritious diet; consequently, they begin to grow fatter, and the unborn young develop fast. The winter coat begins to drop, and a general sleekness comes on both young and old. May sees the doe a renovated being, and usually, also, sees her alone. For now the crowning event of her life is at hand.

The Coming of the Young

"The period of gestation is 205 to 212 days";[70] or about 7 months after the grand, public ceremony in the arena. Then the mother-to-be sneaks off unnoticed and alone. On some island or in a thicket remote from sounds of alien life, she seeks her couch; and quickly, unaided, passes through the ordeal that rounds out the fulness of her life. There, in that leafy sanctuary, is she made quaffer of the double cup of motherhood, the mingled gall and balm.

If she be a young thing now rising two—that is mated and married when but 18 months of age (and such things be)—there is a single fawn. Thus, it is born on its mother's second birthday.

"I have known but one doe to have fawns before she was 2 years old," says W. E., the Deer farmer. "They generally bring forth from the 1st to the 20th of June," he continues. "The earliest that I have known was the 18th of May, and the latest the 12th of July."[71]

This same expert further testifies that "a friend of mine owned a doe that had 3 fawns 3 years in succession, and they were all females."

Bachman's statement[72] is that the first time "she has one fawn. If in good order, she has two the following year. A very large and healthy doe often produces three, and we were present at Goose Creek when an immense one, killed by J. W. Audubon, was ascertained, on being opened, to contain 4 large and well-formed fawns. The average number of fawns in Carolina is 2, and the cases where 3 are produced are nearly as numerous as those in which the young does produce only one at a birth."

Nevertheless, I have never heard of any one seeing a doe actually accompanied by 4 fawns, or even 3. This recalls a fact that I have often noted: that in mammals the average number of young found in embryo, is greater than the average found with the mother, even just after birth.

A sympathetic thrill, a sense of kinship, is surely begotten by the fol-

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[70] Lantz, Raising Deer, p. 46.
[71] Lantz, Raising Deer, p. 41
[72] Q. N. A., II, p. 226.

lowing brief but vivid glimpse of wild life. Mrs. Lafayette Allen, of Wareham, Mass., writes me concerning her husband who was a 'forty-niner:

"Mr. Allen was crossing a mountain range in California, riding his favourite mare, followed by her foal and two young hounds. Suddenly they came upon a dead Deer with two newly born fawns alive, near her; he took these and placed one in each pocket of his hunting coat, jogging along with this strange collection of animals. He looked up at a spur of the mountains not far away, and saw a huge Grizzly-bear 'viewing the landscape o'er.' The wind was blowing from the Bear, and he did not scent the procession, and, strange to say, none of the animals noticed him."[73]

To this, a pleasant thought is added by the Deer farmer quoted above. "Should a doe die, leaving fawns," he says, "one of the other does attends to the fawns as well as if they were her own."[74]

As we have already noted, the mother does not produce till she is two years old. But A. N. Cheney has described[75] a remarkable case of a captive "female fawn born in 1895, that gave birth to a fawn of her own in 1896," that is, when she was but one year old. For a parallel case, see that of the mare given in the Moose Life.

Another strange instance is thus given by E. A. Weatherbee, of Lincoln, Me.:[76]

"Two years ago, in June, I went with friends trout fishing on the Madunkeunk, a stream 8 miles from here. At a place where the ground had been made unusually soft by recent rains, I saw some large Moose tracks, which were punched into the ground to the depth of a foot. I told the boys to notice the tracks, and passed on. One of the party called me to come back and see the Deer he had found. I had stepped directly over a track which contained a small fawn. It was dead, and lay curled up in the track like a kitten. We thought it could not be over one day old, and perhaps not that; and had either been dropped by the doe directly into the Moose track, or had fallen in and could not get out. It was about the size of a House-cat, but with longer legs."

No North American member of the Deer family makes any pretense at a nest. The home of the young is the *neighbourhood* where they are born. They may consider the old fallen tree-top their headquarters, but they will lie in a different part of it every day. Moreover, in Texas, A. Y. Walton

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[73]Letter, July 30, 1909.
[74]Raising Deer, p. 41.
[75]Forest & Stream, Sept. 12, 1896, p. 203
[76]Recreation, March, 1900, p. 205.

says:[77] "I have never known them to lie, at this stage of their life, as the young Sheep and Goats do, almost touching one another, but they lie with more or less distance separating them, never very far apart, and never very close together."

The weight of the fawn at birth is about $3\frac{3}{4}$ pounds, according to Jno. W. Titcomb.[78]

The mother visits them perhaps half a dozen times a day to suckle them. I think that, at night, she lies next them to warm them, although the available testimony shows that, in the daytime, she frequents a solitary bed several yards away. I suppose that she never goes out of hearing of their squeak, except when in search of water.

If found and handled at this time, the fawns instinctively "play dead," are limp, silent, and unresisting.

Their Foes and Defense

Their natural enemies now are numerous. Bears, Wolves, Panthers, Lynxes, Fishers, Dogs, Foxes, and eagles are the most dangerous of the large kind. But the spotted coats of the fawns and their death-like stillness are wonderful safeguards. Many hunters maintain, moreover, that fawns give out no scent. Doubtless, this means that their body-scent is reduced to a minimum; and, since they do not travel, they leave no foot-scent at all.

Discussing the perils of the young, Capt. Marcy says: "It might be supposed that, in a country where there are so many carnivorous animals, the greater portion of the Deer would be killed by them while young; but nature, in the wisdom of its arrangements, has provided the helpless little quadruped with a means of security against their attacks, which is truly wonderful. It is a well-known fact among hunters that the Deer deposit a much stronger scent upon their tracks than any other animal, inasmuch as a Dog can without difficulty follow them long after they have passed at a distance of many yards from the track. Notwithstanding this, the fawns, until they are sufficiently grown to be able to make good running, give out no scent whatever upon their tracks, and a Dog of the best nose cannot follow them except by sight. I have often seen the experiment made, and am perfectly satisfied that such is the case; this, therefore, must in a great measure protect them from the attacks of the wild animals of the country."[79]

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[77]Deer, Texas, p. 485.

[78]Forest & Stream, March 18, 1899, p. 205.

[79]Red River, 1854, p. 67.

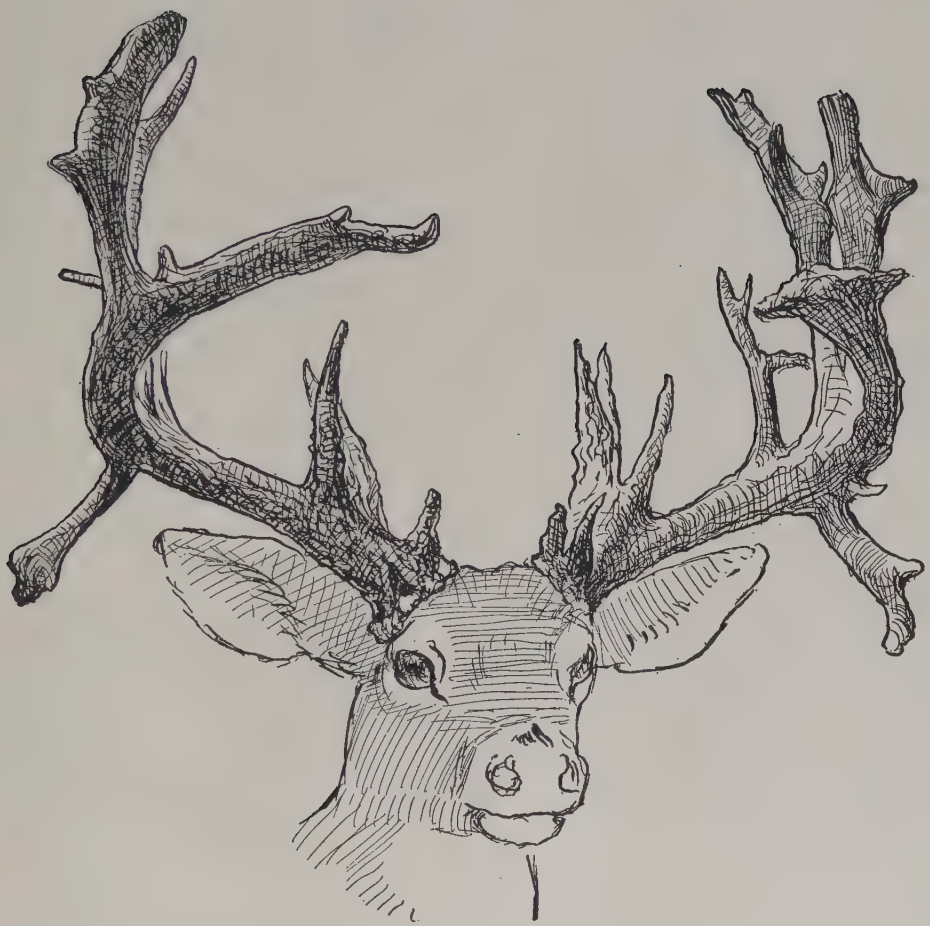


PLATE XLI.—THE CÆSAR WHITETAIL

Length 29 inches, girth, 6 inches; widest outside spread, 27¾ inches; points, 18+24. In Nat. Coll. Heads and Horns. Believed to be the world record of the species.

So far, we have had testimony to the tenderness of the devoted but timid mother. It is a joyful privilege to add here a story that proclaims her courage. B. A. Eastman of Barre, Vt., writes me:

"I drove with an auto to a large swamp one evening with my Coon Dog. Upon stopping my car, the Dog got out and immediately entered the swamp and commenced his hunting, while I waited for him. The road skirted the edge of the swamp for 300 yards or more; and with my headlights on, I could see far down the highway. The Dog had nearly reached the further end of the swamp, when I heard him 'yip.' He hunted nothing but Coon, and seldom barked except when they treed. Again I heard him cry out; and from down the road a moment later, I heard the clattering of feet on the frozen ground, when the Dog came in sight with a Deer just one leap behind. It was a wonderful race—the Dog ran straight past the car, and the Deer came to a sudden stop almost on the headlights. It was a beautiful large doe, and no doubt had a baby back in the swamp."[80]

There is one more large creature that some would put on the fawn's list of enemies (but, so far as I can learn, without good reason), and that is—*their own father*. I can believe that a doe coming upon a fawn clearly not her own, might resent with a blow any attempted liberties, but I know of no reason for supposing that, in a wild state, the buck would go out of his way to injure his offspring.

The mother is ready at all times to render what protection she can to her fawn; and, unless hopelessly overmatched, she is wonderfully efficient. Her readiness to run to her young at their call of distress is (or was) often turned to unfair account by the hunters in the Southwest. They manufactured a reed that imitated the fawn's bleat, and thus brought within gunshot, not only the anxious mother, but sometimes also the prowling Cougar and Lynx.

Their Baby Days

Natural questions that arise are: Does the mother never forget where she hid her young? Can she come back to the very spot in the unvaried woods, even when driven a mile or two away by some dreaded foe?

In the vast majority of cases, the mother's memory of the place enables her to come back to her baby's hiding-place. Sometimes it happens that an enemy forces the little one to run and hide elsewhere, while the mother is away. In such cases, she sets to work to ransack the neighbourhood, to search the ground and the wind for a helpful scent, listening intently for every sound. A rustle or a squeak is enough to make her dash excitedly to

[80]Letter, April 3, 1924.

the quarter whence it came. It is probable, though I have no conclusive proof, that now she *calls* for the fawn, as does a Cow or a Sheep whose young are missing.

In most cases, her hearty endeavours succeed. But there is evidence that sometimes the end is a tragedy—that the fawns, like the children of the story, are lost in the woods.

The Moose and the Wapiti may hide their young two or three days, the Antelope for a week; but the Whitetail fawns are usually left in their first covert for a month or more.

At this age, their rich brown coats are set off with pure white spots, like a brown log sprinkled with snowdrops, or flecked with sunlight. This makes a colour scheme that is protective as they crouch in the leaves, and is exquisitely beautiful when, later on, they bound or glide by their mother's side to the appreciative mirror furnished by their daily drinking pool.

At 4 or 5 weeks of age—that is, about the beginning of July—they begin to follow their mother. I examined one, however, that was found hidden in the grass near Dauphin Lake, Manitoba, as late as the 22d of August.

Their Summer Life

Analogy would prove that the fawns begin to eat solid food at this time. They develop rapidly and become very swift-footed. Some hunters maintain that they are even swifter than their parents; but this is, I think, not the case. It is a fact that, of two animals going at the same rate, the smaller always *appears to be the faster.*

Their daily lives now are as unvaried as they can make them. They rest in some cool shelter during the heat of the morning, and about noon they go to their drinking place.

The mother Whitetail, after a copious draught, sufficient to last all day long, retires again with her family to chew the cud in their old retreat, where they escape the deer-flies and heat, but suffer the mosquitoes and ticks.

As the sun lowers, they get up and go forth stealthily to feed, perhaps by the margin of the forest where grow their favourite grasses, or the nearest pond, where the lily-pads abound; and root, stem, and leaf provide a feast that will tempt the Deer from afar. They munch away till the night grows black; then sneak back to some other part of the home covert—rarely the same bed—where they doze and chew the cud till dawn comes on. Then, again, they take advantage of the half-light they love, and go foraging till warned by the sunrise that they must once more hide away.

This is a skeleton of their daily programme in the wilderness, but they modify it considerably for life around the settlements. The noonday visit to the watering place is dispensed with. Instead, they go by night. Foraging in daylight hours is given up. Secret and silent as the Coon, the Whitetail family lurk in their coppice all day; and at night go, not to the lily-padded shore, but to the fields of grain, clover, turnips, or garden-truck. Lightly the alert and shadow-like mother approaches the fence; behind, in her track, are the fawns—not even shadow-like, for they are actually invisible in their dappled coats. A moment she listens; then, with a bound, she clears the fence and, followed by her young, lands in the banquet spread.

These visits are never made during the day, nor during hours of black darkness, for even Deer require some light to see by. A favourite time for such a frontier foray is in the moonlight; and the rising of the moon is, in all much-hunted regions, a signal for the Deer to go forth. Many supposed irregularities in their habits will be explained by reference to the lunar calendar.

As September wanes, there are two important changes in the fawns: first they are weaned; second, they shed their spotted—their milk-spotted—coat. They are now fawns of the year. As Caton says,[81] they are weaned at about 4 months of age, but continue to follow the dam, "the males for one year, the females for two years." An exception to this rule is during that interesting first month of the little ones' lives. Then, the older sisters or brothers may be lurking in the neighbourhood; they may join the mother at the drinking place. But during the nursing hours, she does not want them near; and, if need be, takes rude means to prevent their coming.

In September, too, there is a disposition to reunite.

The Buck and His Antlers

The bucks shed their antlers in January, earlier, if very vigorous; weeks later, if puny. In Vermont, J. W. Titcomb's tame buck shed one antler on the 26th of February and the second on the 1st of March.[82]

When the melting snow leaves the sexes free to seek or shun each other at will, the bucks turn their unantlered heads from the social herd, and wander off, usually two together, as with most of our horned ruminants.

Bare ground, with its sprouting grass and shoots, now supplies bountiful food. The surplus energies of the does go to the unborn young; that of

[81] Ant. & Deer, p. 308.

[82] Forest & Stream, March 18, 1899, p. 205.

the bucks to their budding antlers. These make their appearance from two to six weeks after the old ones are dropped. It probably takes as much energy, though but half the time, to grow a pair of antlers as to grow a pair of fawns.

The development of the horns goes on with the marvellous rapidity already noted. During the early stages, they are so soft as to be almost plastic; and every accident to them is recorded in their shape. By August, they are completed, though still in the velvet. By the middle of September, the buck has scraped them clean and polished them. Until the last two or three weeks, the antlers have blood-vessels throbbing with blood; they have nerves and are sensitive, and they are integral parts of the animal's body.

The antlers are, of course, doomed to die and drop off within three months of reaching maturity. Death begins at the points and follows downward and inward, till the whole structure is killed; and it is during the progress of this slow dying that the antlers fill the office for which they were created. This is well known; but Judge Caton, our great Deer authority, gives some surprising additional information.[83]

"The evidence," says he, "derived from a very great multitude of observations, made through a course of years, is conclusive that nature prompts the animal to denude its antlers of their covering at a certain period of its growth, while yet the blood has as free access to that covering as it ever had."

That is to say, the buck voluntarily subjects himself to a painful operation while yet the horn is living and sensitive. Why? There must be a good reason. Maybe to allay irritation, or possibly because the earlier his antlers are cleaned, the sooner he can enter the arena in which wives go to the winner. Natural selection, therefore, would tend to foster the habit.

His Summer Ways

All summer, he has been living as quietly as the doe; sometimes frequenting the same places, but ignoring her if they chance there together. The margins of the forest and of the lake have powerful charms for him now, not only for his food supply, but because there he knows he can protect himself at once from the torment of the flies and the fiercer summer heat. John Bachman's account[84] shows his method of doing this, and illustrates at the same time the cunning of the old buck:

"To avoid the persecution of moschetoes and ticks, it occasionally, like the Moose in Maine, resorts to some stream or pond, and lies for a time

[83] Ant. & Deer, p. 172.

[84] Q. N. A., II, p. 223.

immersed in the water, from which the nose and a part of the head only project. We recollect an occasion when, on sitting down to rest on the margin of the Santee River, we observed a pair of antlers on the surface of the water near an old tree, not ten steps from us. The half-closed eye of the buck was upon us; we were without a gun, and he was, therefore, safe from any injury we could inflict on him. Anxious to observe the cunning he would display, we turned our eyes another way and commenced a careless whistle, as if for our own amusement, walking gradually toward him in a circuitous route, until we arrived within a few feet of him. He had now sunk so deep in the water that an inch only of his nose and slight portions of his prongs were seen above the surface. We again sat down on the bank for some minutes, pretending to read a book. At length, we suddenly directed our eyes toward him and raised our hand, when he rushed to the shore and dashed through the rattling canebrake in rapid style."

Wallows

In the mating season, the European Red-deer makes what is known as a "soiling pit." In some open glade, he digs a hole in which the rain collects. This he paws and stirs till it becomes what our backwoodsmen would call "a regular dope." With the mud, he besmears himself plentifully, rolling and grovelling in it like a Hog that has only partly learned how to wallow. The habit is ascribed to both Moose and Wapiti, and is also seen to some extent in the Whitetail Deer. What pleasure it gives the animal, or what purpose it serves, no one knows; but every hunter who finds one of these odoriferous cesspools of the forest, knows at once that the bucks have begun to bestir themselves for the good of the next generation.

My guides on the Ottawa assured me that the Whitetail makes more of a wallow in rutting season than the Moose. The wallow is made by the buck only. The guides agreed that the buck waters in it; it smells so horrible. Whether the wallow is a sex or sanitary institution is not known.

Need for Salt

All our ruminants have a great fondness for salt, and eagerly seek out anything of a salty taste that they can find in their native range. They doubtless need it for a tonic. Many different soluble mineral salts seem to satisfy this craving. Merriam calls attention[85] to a case in the Adirondacks where "the Deer had licked the clay, possibly obtaining a trifle of potash, alumina, and iron, derived from sulphates from decomposing pyrites."

[85] Mamm. Adir., p. 135.

In all well-managed Deer parks now, salt is provided at convenient places and regular intervals. According to H. C. Bryant, "Some salt bricks were furnished forest officers in Trinity County by the Commission in 1915. The Deer made good use of this salt after they had become accustomed to the bricks. . . .

"There is a real necessity for salting Deer. It is, of course, well known and recognized that Cattle absolutely must have salt to grow in weight, and to remain healthful. As Deer have always used licks, it is assumed that this method of salting is satisfactory."[86]

War-cries and Signals

As October comes on, another change sets in with the bucks. Their necks begin to swell, and their mating instincts to arouse. Hitherto, they have been indifferent to the does when they met by chance, but now they begin to seek them. Of this, I saw some signs on the Ottawa as early as the 15th of September. George Linklater, the guide there, assures me that he saw two bucks in full chase of a doe on the 10th of October.

But the females are of another mind. Caton says:[87] "The pursuit of the doe by the buck commences before her season has arrived, and hence for two or three weeks she remains as secluded as possible. He follows her track with his nose to the ground, and when started from her bed, the race is very spirited."

An old hunter, A. Y. Walton, writes: "Should any one, hunting at this time in a good Deer range, observe a doe by herself, galloping along *with her tail down*, ever and anon looking back, as if looking for something in pursuit, and acting as if she were endeavouring to secrete herself, he should lose no time in availing himself of the situation."[88]

This advice Doctor Bachman seems to have followed many years before it was given. He relates:[89] "We were, on an autumnal morning, seated on a log in the pine lands of Carolina, when a doe came running past us. In the course of ten minutes, we observed a buck in pursuit, with his nose near the ground, following in all the windings of her course. Half an hour afterward came a second buck, and during another interval a third small buck pursued the same trail."

The buck does not gather around him a band of does as does the successful bull Wapiti, and it is sometimes said that he does not issue any sort

[86]Cal. F. & G., July, 1918, p. 144.
[87]Ant. & Deer, p. 307.
[88]Deer, Texas, p. 485.
[89]Q. N. A., II, p. 227.

Seventy-eight-point Whitetail killed in Texas

Spread, 26½ inches

From photograph by their owner, Albert Friedrich, of San Antonio, Texas

Three-horned Whitetail

From Brainerd, Minn., Dec., 1897. Collection of C. J. Gunston, of Seattle, Wash.

Forty-two-point Adirondack buck

Redrawn from photograph in New York State Fish and Game Report, 1896

Quebec Whitetail

From photograph by Norman H. H. Lett

Thirty-five-point Whitetail from Minnesota

From photograph by K. H. C., *Recreation*, June, 1897

Minnesota Whitetail

From Brainerd, Minn., Dec., 1897. Collection of C. J. Gunston, of Seattle, Wash.

PLATE XLII.—FREAK ANTLERS OF WHITETAIL

PLATE XLVI.—WHITETAIL IN WINTER LANDSCAPE
Photograph in Yellowstone Park, by E. T. Seton

PLATE XXXVIII.—WHITETAILED DEER

(*Odocoileus virginianus* (Bodd.))

of challenge. But the following curious paragraph by "Bachelor"[90] shows that the buck has both the disposition and the voice to challenge at times:

"Some years since . . . I was still-hunting in Arkansas. . . . I had been standing several minutes when I heard three successive sounds, or noises, that were much louder and coarser than the whistle or snort of any Deer I had previously heard. At first, I thought it some other animal, but presently he was in sight, and when within about 200 yards of me, he ran into a flock of turkeys. He would single one out and chase it away, then another, until he had chased off 9 or 10, likely all of the flock, when he returned to the line or track he was following, and came on, part of the time trotting and part of the time walking, but all the time travelling as if he were tracking something.

"When within 80 yards of me, he came on my track and stopped, turning half around, giving me a fine shot. He was only a 3-point buck, and rather small for a 3-pointer, but he seemed to be on the war path, judging by the way he chased the turkeys, and he seemed to care very little for me. Now, I have frequently heard Deer whistle when frightened, and have heard them snort from some cause, but this Deer made altogether a louder and different noise from either."

George Crawford and Linklater, guides of Mattawa, Ont., assure me that at this season the bucks utter a peculiar call, like a Sheep bleating or like the creaking of two trees rubbing together.

Chapman Grant describes a mode of decoying Deer that was—until declared illegal—of large vogue in Texas. Climbing some convenient tree in Deer country, the hunter took a couple of loose antlers carried for the purpose, and clashed them together like two bucks fighting. The Texan Deer must be like our own small boys—wild to see a fight—for they were said to come from all directions to look on or take part, and the rifleman could take his pick.[91]

Their method of signalling with flashes of the Whitetail is briefly described in the chapter on "So Say the Guides."

Mars and Venus

As November, the true rutting time, draws near, the necks of the bucks become enormously enlarged. As early as the last week in October, Merriam measured[92] the neck of a buck that was 30 inches in circumference, only

[90]Forest & Stream, Oct. 5, 1895, p. 292.

[91]Big Game of the Texas Border, quoted in N. Y. Zool. Bull., July, 1916, p. 1385.

[92]Mamm. Adir., p. 116.

10 inches behind the ear. Ordinarily, it would have been about 20 around. The maximum development is attained about the middle of November, which is also the height of the rut.

A buck whose neck was 37 inches around, is recorded by A. N. Cheney.[93]

Their whole nature seems to undergo a corresponding change at this time; and by November they are blind and mad with desire, as well as ready and eager to fight any of their own or other kind that seems likely to hinder their search for a mate.

"At this season," says Merriam,[94] "the bucks not only fight amongst themselves, but occasionally attack man; and more than one unfortunate person has been gored to death by them. In battle, they make use of their horns, and also of their fore-feet, whose sharp hoofs are capable of inflicting terrible wounds."

Tamable but Treacherous

Experience shows that young Whitetails, taken after they have begun to run with the mother, are so fully possessed of the feral nature that they remain wild and distrustful for the rest of their days, in spite of all efforts to tame them. But if caught during the hiding period of infancy, they are as easy to tame as puppies. Nevertheless, those who are tempted by opportunity should be warned that a Deer is the most treacherous of pets. The only change that domestication makes in them is to rob them of their fear of man. Their fierce, combative disposition remains, and is ever ready to break out. Not only children and women, but many strong men have met with tragic ends from some tame Deer—doe as often as buck—that was supposed to be the gentlest, loveliest creature on earth.

Merriam says:[95] "Both my father and myself have been knocked flat on the ground by being struck in the abdomen by the forefeet of a very harmless-looking doe."

Their Way of Attack

On the same page, Merriam says: "I was once sitting quietly on a log in a Deer park when a buck approached, and, making a sudden spring, dealt me such a powerful blow on the head with the hoofs of his forefeet, as to render me unconscious. No sooner was I thrown upon the ground than the vicious beast sprang upon me, and would doubtless have killed me outright had it not been for the intervention of a man, who rushed at him with a club and finally drove him off."

[93] 1st Ann. Rep., p. 201.
[94] Mamm. Adir., p. 117.
[95] Mamm. Adir., p. 117.

I recollect a case that happened near Lindsay, Ont., during my early life. A tame Deer was confined in a certain orchard. The grandmother from the adjoining farm, paying a call, chanced to take a short cut through that orchard. Hours afterward, they found the shapeless remains of her body, cut and trampled to rags by the feet of the pet Deer that she had fed a hundred times.

Charles C. Worthington, of Buckland Park, Warren Co., N. J., writing to the Biological Survey of his experience with vicious bucks, says: "The first serious difficulty I experienced, and one the gravity of which should not be lost sight of by any one starting a preserve, was with the tame bucks at the rutting season. These bucks, from being tame and docile, would become at this season fierce and dangerous. They would attack any one at sight, even a person on horseback, or in a wagon. Some of the game-keepers had narrow escapes from being killed; in one or two instances being seriously injured. A pedestrian's only chance for escape was to climb a tree. Those bucks which developed this ferocity had to be systematically hunted and shot on sight. Those left were the ones that had not been originally tamed, and not being accustomed to the sight of man, had not courage enough to make an attack. My experience is that a wild buck, even in the rutting season, still retains his natural fear of man, and, except when wounded, is never dangerous."[96]

As further examples, the following will serve.

"*Racine, Wis.*—After fighting over thirty minutes with an enraged buck Deer, Joseph Shulax, an employee of ex-Mayor M. M. Secor, came out alive, but badly cut and lacerated, and it will be weeks before his wounds are healed. Mr. Secor is the owner of a small zoological garden, in which are kept Deer and other animals. A large buck got loose in the orchard, and Shulax attempted to drive it back into the enclosure. The animal turned and struck him with its forefeet; he went down, cut and bleeding. When he attempted to get up, the beast was after him again. Nine times he was knocked over. After a desperate fight, the man succeeded in escaping by crawling through a gate. Shulax is cut about the legs, body, and arms, but not fatally hurt."[97]

"The body of Herbert Bradley was found last Saturday night in the woods on his estate near Montclair, N. J., and next day it was proved that a pet buck Deer had injured him so badly that he bled to death from a wound in the thigh.

"Mr. Bradley was last seen alive shortly before dark on Saturday,

[96]Lantz, Raising Deer, pp. 47–48.

[97]St. Paul. Minn. Dispatch, March 19, 1902.

engaged with a servant in putting out a fire in the dead leaves on his place.

"From evidences found next day, it appears that the buck charged him, and that he tried to drive it away with a broom he was using to beat out the fire, but it wounded him so severely that he died from loss of blood after crawling 100 yards toward his house. He was missed and the search began after he had bled to death. Next day the buck was found to be spattered with blood, and shot.

"The buck was one of the small herd kept as pets on the place, and it is supposed that Mr. Bradley, in fighting the fire, paid no attention to the excited buck until it made for him."[98]

"*Babylon, N. Y.*—The body of Patrick Horon, 64 years old, deer-keeper for 14 years on the Edwin Hawley place at West Islip, was found in the Deer pen by Supt. John Williams this afternoon. The body was warm when it was pulled out. Two ugly wounds over the lungs indicated that an infuriated buck had killed the man. His face had apparently been trampled on. . . .

"It was known to be ugly, and Horon had been warned to be careful, but he was not afraid and laughed at the caution."[99]

One might easily collect scores of instances to show that all our American species of Deer—not only the bucks in autumn, but bucks or does in spring, summer, autumn, or winter—after the second year, *may* become dangerous animals; and are almost sure to become so if not fully inspired with fear of man.

It is the opinion of all who have studied tame Deer that they are more dangerous than tame Bears. A Bear, one knows should be watched, and he has some respect for his friends. A Deer is always unsafe for every one, and no man should ever expose himself or his family to the possible treachery of such a pet.

The Dangerous Wild Buck

So far, we have considered the captive or pet buck. Usually the timidity of the wild buck or the man-terror that is on all wild things, is enough to offset its fighting courage even in rut. But there are exceptions to this.

The Springfield, Mass., *Union* reports that D. H. Eaton, of Wilbraham, on the Wilbraham Mountains, while out gunning, was attacked by a buck. He had given it no provocation, and would have been killed but for his Dog.[100]

A still more thrilling experience is related by J. Parker Whitney. "It is

[98]Forest & Stream, Nov. 17, 1906, p. 778.

[99]N. Y. Times, Jan. 13, 1914, p. 1.

[100]Forest & Stream, Dec. 2, 1899, p. 449.

very rare," he says, "that a buck, however large and savage, will charge a stalker without provocation; but occasionally in the mating season, when wounded, they will charge. I had an encounter of this kind in 1859, on my second visit to this region, from which I escaped with scarcely a scratch, killing a buck which dressed up to 230 pounds, with a single heart-thrust of my hunting knife. It was in 18 inches of snow. In a thicket, I came suddenly upon a large buck I had been tracking which I slightly wounded with a hasty shot. In a flash, he turned upon me. It was before the day of the repeating rifles. I had barely time to drop my rifle and step aside and draw my hunting knife, when I was borne down into the snow by the weight of the descending buck, which I caught about the neck, and as he rose drove my knife to the hilt in his chest at the junction of the throat, severing his windpipe and splitting his heart. Death was instantaneous. I had a difficulty in withdrawing myself quickly enough to escape the red torrent of life-blood which gushed forth."[101]

It is well to note that all cases recorded occurred during the November madness.

Mounted on snowshoes, J. H. Sykes, of Swift Current, Sask., who tells the following tale, and his guide, Malcolm Buchanan, had run down a large buck and two does in the deep snow of mid-February. The does at last were completely exhausted, and stopped. The buck went a little farther. They incautiously approached the snowbound buck. But the creature sprang on the man and struck "with both forefeet, and knocked him sprawling in the snow, feet upwards with the buck over him. It was done so quickly that I hardly knew what had happened, and being only a boy, I didn't realize the danger he was in. I started to laugh, but my mirth soon turned, and in a second I became more serious when the buck turned and landed on me as he had done to my friend, leaving us both down, with snowshoes sticking up in that terrible deep snow, and not being able to loosen them, we nearly suffocated." The men escaped, but so did the buck.[102]

In these battles, if the Deer is the conqueror, he usually manifests almost as much bloody ferocity as the human being. He never ceases to batter, spear, and trample his victim as long as any sign of life remains.

Several hunters have related to me how, when downed in the snow by some furious buck, they have saved their lives by feigning death. Their stillness convinced the stag that his revenge was complete, and he slowly withdrew, casting, nevertheless, many a backward glance to satisfy himself that truly his foe was done for.

[101]Forest & Stream, Dec. 26, 1896, p. 508.

[102]Canadian Forest & Outdoors, June, 1924, p. 387.

Effects of Fear

Swan Schriver, of Petoskey, Mich., had a flying glimpse of a doe, and fired with buckshot. But she disappeared in the woods. He continues: "I ran to the top of the ridge to get another shot, but could see nothing. I went back to the place where I last saw her, and found her tracks. Those I followed for about 200 feet, and there lay the doe stone dead. The only wound I could find on her was in the left hind leg, where one of the buckshot had penetrated. I skinned the Deer there, but not another wound could I find."[103]

Bachman offers a different evidence of the effect of fear. It was told him "by an old resident of Carolina: Some 40 years ago, during a tremendous flood in the Santee River, he saw two or three Deer on a small mound not 20 feet in diameter, surrounded by a wide sea of waters, with a Cougar seated in the midst of them; both parties, having seemingly entered into a truce at a time when their lives seemed equally in jeopardy, were apparently disposed peaceably to await the falling of the waters that surrounded them."[104]

The Battle Between Bucks

But it is for the rival of his own race that his weapons are grown, and his fiercest animosity poured out. Strange to tell, in battles with his own kind, his antlers prove almost wholly weapons of defense. Desperate effort and trifling bloodshed seem to be a fair summary of the usual fight between two bucks.

A typical duel is thus described by Judge Caton:

"The battle was joined by a rush together like rams, their faces bowed nearly to a level with the ground, when the clash of horns could have been heard at a great distance; but they did not again fall back to repeat the shock, as is usual with rams, but the battle was continued by pushing, guarding, and attempting to break each other's guard; and goading whenever a chance could be got, which was very rare. It was a trial of strength and endurance, assisted by skill in fencing and activity.

"The contest lasted for two hours without the animals being once separated, during which they fought over perhaps half an acre of ground. Almost from the beginning, both fought with their mouths open, for they do not protrude the tongue prominently like the Ox, when breathing through the mouth. So evenly matched were they that both were nearly exhausted

[103] Recreation, Nov., 1898, p. 365.

[104] Q. N. A., I, pp. 256–57.

Deer horn embedded in oak

Specimen in New York State Museum. Drawn from photograph supplied by the Director of the Museum.

Inscribed: "This portion of an oak tree with a Deer's head and horns was taken from a forest in the State of Michigan. It is believed that the tree was between 40 and 50 years old. Presented to the Museum by the Hon. William Kelley, of Rhinebeck, Nov. 24, 1859."

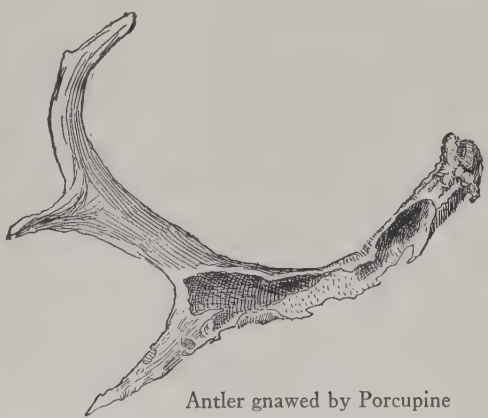
Whitetail Buck with remarkable palmations

Killed at North Lake Reservoir, town of Wilmurt, Herkimer County, N. Y., fall of 1891
Drawn from photographs by Egbert Bagg, of Utica, N. Y.

Antler of Virginia Deer embedded in tree trunk

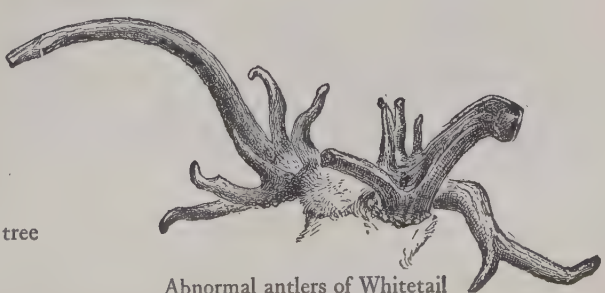
Locality, New York State

From photograph of specimen in New York State Museum, by courtesy of Director John M. Clarke



Antler gnawed by Porcupine

Adirondacks, 1908



Abnormal antlers of Whitetail

Redrawn from Caton's figure

when one at last suddenly turned tail to and fled; his adversary pursued him but a little way. I could not detect a scratch upon either sufficient to scrape off the hair, and the only punishment suffered was fatigue and a consciousness of defeat by the vanquished."[105]

Still the affair must be considered a success, because it answers its purpose—it decides what the combatants set out to learn, namely, which is the better buck.

Their Marriage Customs

What is the way of the Whitetail? Neither Bachman nor Caton says definitely that the species is polygamous.

Lantz says in his pamphlet on "Raising Deer": "Deer are polygamous like Cattle" (p. 66). "One buck for each 10 or 12 does will probably be enough. New bucks should frequently be introduced to avoid inbreeding" (p. 48). But this refers to captives under abnormal conditions, and cannot be accepted as a quite conclusive statement.

Ray Bergman, in his "Trails of a Forest Lover," contributes a delightful chapter that is more nearly in point. For the creatures in it were wild, though in a protected region.

He was prowling in this Deer range during autumn, and suddenly flushed a buck and 3 does. He froze as they turned to gaze. The buck, a 10-pointer, stood staring in worry and wonderment; then "turned to the does and snorted (a commanding WHOOF!). The does obediently disappeared from view into the surrounding brush, but Mr. Buck stood his ground. For another minute, he remained there pawing the ground; then he started circling toward me, coming nearer with every step, but at the same time edging to the windward of me where he would get the scent of that puzzling object.

"When he reached a point about 20 feet from me, he stopped. I looked into a pair of eyes that showed puzzlement, pride and combativeness, but never a trace of fear. The magnificent animal shook his head rather savagely, and for an instant a qualm of fear rushed over me, but still I managed to keep perfectly rigid.

"For perhaps two minutes, we faced each other. I could feel a sort of physical power in his gaze, could actually feel the wonder and uncertainty that was his. Then I felt a puff of wind at my back. Immediately a transformation came over the animal. He sniffed, looked startled, and then wheeled around and went bounding off, letting out as he did so, a shrill

[105] Ant. & Deer, p. 307.

whistle of warning to let his charges know that it was DANGER that he had found."[106]

A still more idyllic scene is sketched by the same writer. He tells[107] of cautiously following the trail of a doe Whitetail as she sauntered through the woods. Then the trail of a big buck joined on. He says: "Topping the crest, I saw a sight that made me freeze into a statue. A beautiful, apparently young and decidedly graceful doe stood not 50 feet away from me. At her side stood a magnificent buck, whose twelve tines shone like burnished copper in the fading light.

"The hunting instinct left me as if by magic. I stood spellbound, intent only on the doings of those two wonderful animals so near me. The buck gently rubbed his nose against the doe's face, then they 'nuzzled' each other in the most affectionate manner imaginable. As much as I wanted a buck, I could not shoot, and the old Winchester remained silent at my side.

"The last view I had of the 'lovers' as the darkness dissolved them from my vision, was two white tails sympathetically—and I think also ecstatically—flapping like giant moths. For some 30 minutes after, I stood there silently, not wanting to spoil their tryst. Having kept quiet as long as I possibly could, in such an uncomfortable position, I finally started for camp. My departure did not cause any disturbance, which told me that the 'lovers' had silently moved away while I stood there in the darkness."

So Say the Guides

George Linklater, of Mattawa, is only one of many guides who assure me that they have seen two does with one buck in the mating time.

After discussing the fact that some other Deer are polygamous, and the Whitetail occasionally so, A. Rutledge, the well-known sportsman, says: "But my own observations of the common Whitetailed Deer of this country, leave me convinced that they at least are nearly always monogamous.

"The doe, it is true, goes off by herself before the birth of the fawn, but I have seen buck, doe, and fawn in company when the fawns were not many weeks old, as well as later in the season when they were nearly half grown.

"I once saw a large buck crossing from one woodland to another, keeping to what little cover was afforded by the young growth and alders along the riverside. Coming to the border of the dark hemlock woods, he was confronted by a six-strand barbed wire fence. Here he stopped and looked back, flashing his white tail repeatedly as a signal. Looking in the same

[106] Forest & Stream, Jan., 1926, p. 14.

[107] As above, p. 13.

direction, I saw a white tail flash in answer, from among the bushes by the stream a quarter of a mile back along the course which he had followed.

"Presently a doe and two fawns came in sight, crossing the open, and coming close up to him, as he stood there by the wire fence.

"Clearing this at a bound, as he turned and waited until the fawns, after much hesitation, had managed to get over the fence, then the doe leaped over, and the whole family disappeared among the hemlocks.

"On another occasion, this time in the spring, I saw a Fox run out from the edge of the woods with a buck and doe in pursuit.

"After the Fox had retreated to the meadows, the Deer went back into the woods, where I suspected that their fawns were in hiding.

"I have never yet seen a buck accompanied by more than one doe."[108]

Such behaviour points not only to monogamy, but to lifelong union.

Thus, then, may we summarize the evidence. The Whitetail, though far from monogamous, and at times very flagrantly bigamous indeed, is still the least polygamous of our Deer.

In this connection, I note with interest that often the buck is seen leading the band; whereas, in the polygamous Wapiti and Red-deer, the leader is usually an old doe. One naturally asks the question: Is female leadership a penalty of polygamy? It would seem an inevitable outcome of the approved doctrine that the majority must be right.

Duration of the Rut

The rut of the Whitetail buck seems to be of unusual duration—commonly as long as two months, with November as its climax. We cannot suppose it to be the same with the does. Many observations and inquiries lead me to conclude that the buck Whitetail is usually seen with one doe, sometimes with two, rarely with three, never more. It seems probable that the buck foregathers with some suitable female as soon as possible; but her devotion does not last as long as his—no, not a quarter as long; and when she is no longer responsive, he seeks another mate or mates. His ménage may be entirely changed, therefore, two or three times during the autumn period of excitement.

Hybrids

Hybrids between Deer of different species, but of the same genus, are common. Caton describes a number of them in his masterful treatise on the "Antelope and Deer of America."

In his "Mammals of the Mexican Boundary," 1907, Part I, pp. 195, *et*

[108] Forest & Stream, Nov., 1924, p. 651.

seq., Dr. Edgar A. Mearns describes *Odocoileus crooki*, a new Deer that he found in Arizona. There seems to be little doubt that it was merely a hybrid between the Whitetail and the Mule-deer. In the latter Life, it is more fully treated.

Good-fellowship

That the Whitetail is not without the instincts of good fellowship is attested by the following. A. Rutledge, out of the amplitude of his experience, writes: It often "happens that when two Deer are running together, and one is shot down, the other may stop within a short distance, waiting for its comrade. Some hunters are deceived by this matter into believing that the one shot has killed one Deer and crippled the second. If, after being shot at, Deer separate, the chances are that one has been hit. Yet I have seen two old beautiful bucks run together for half an hour and then decide to separate, probably thinking such a manœuvre a puzzler for the hounds."[109]

He says further: "In the winter, it is not uncommon to find one or two young bucks going about in company with an old antlered buck of many years' experience."[110]

Arthur F. Rice, of the Camp Fire Club, described to me (Dec. 1, 1909) a place in the forest where Whitetail fawns had a huge ring around a tree. The guide said it was where they came to play. He was struck by the fact that none but fawn tracks were there. The mothers, no doubt, stood aside.

Winter Life and Yard

In mid-December, after the annual climax of their lives is over, the jealousies, the animosities, the aspirations of the males, the timidities and anxieties of the females are gradually forgotten. The Mad Moon wanes, a saner good-fellowship persists; and now the Whitetails—male, female, and young—roam in bands that are larger than at any other time of the year.

Food is plentiful and they fatten quickly, storing up (even as do Squirrel and Beaver) for the starvation time ahead—only the Deer store it up in their persons, where it is available as soon as needed, where it helps to cover them from the cold, and whence it cannot be stolen, except "over their dead bodies," by a burglar stronger than the householder himself.

They wander thus, in their own little corner of the wilderness, till some heavy snowfall cuts down their daily roaming to a smaller reach. As the drifts grow deeper, their countless tracks and trails, crossing and recrossing,

[109]Forest & Stream, Nov., 1922, p. 484.

[110]As above, Nov., 1924, p. 651.

make many safe footways in this Deer yard where the food is best; although round about them, twenty feet away, is the untrodden and deep-lying snow, that walls them in and holds them prisoners fast; until its melting sets them free to live these many chapters over again.

Feed Time

"When there is a good moon," says T. S. Van Dyke, "Deer will feed mostly at night; but if not, it will be about the first glimpse of daylight. . . . After feeding, they go off from half a mile to a mile or more to lie down for the day, generally in rough and brushy ground. But in doing this, they are seldom in any hurry, especially if there is no moon. They loaf along up these intervening flats or pass from ridge to ridge, browsing a little, loafing here and there."[111]

Ample and detailed corroboration of Van Dyke's statements is furnished by most old hunters, including Julian.[112]

Kinds of Food

The widespread notion that Deer feed chiefly on grass, is ill-founded. Grass they will eat at times, but the main and necessary diet of the Whitetail is brushwood, twigs, and leaves of trees.

Van Dyke says: "Deer are naturally browsing animals like the Goat, caring little for grass or grain, except when it is young and tender. . . . But they are also lovers of specialties like beechnuts and 'mast' of every kind, and acorns are most common of this stuff. Wherever there are plenty of acorns, Deer will concentrate if there are any within a few miles. And often, they will move many leagues from their summer range to a good acorn range."[113]

Charles Goodnight, after years of observations, says: "Deer will not eat ordinary grass if they can help it, but will eat wild rye and other kinds of soft grasses. With a properly selected place, they are of very little expense after the pasture is fenced."[114]

To this, Lantz adds: "The Whitetailed Deer is even more a browsing animal than the Elk; and yet it can and often does manage to get along in summer on grass alone. In a cultivated pasture, it eats rank weeds and wild grasses in preference to timothy or blue grass."[115]

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[111] Find Deer, p. 206.
[112] Old Hunters, p. 536.
[113] Find Deer, p. 206.
[114] Raising Deer, p. 43
[115] As above, p. 46.

In *Forest & Stream* for Nov. 28, 1896, pp. 423–24, is a symposium on "Deer and Lilypads." In this, it is clearly proven by a dozen witnesses, including Manly Hardy and Dr. Robert T. Morris, that Whitetailed Deer habitually feed on the yellow water lily during summer. They eat leaves, stems, flowers, as well as roots, and often do so when they must dip their heads deep under water or swim as they feed.

"Deer, like Cattle, are passionately fond of this shrub [poison oak] and in their browsings, will frequently ensconce themselves in a thicket of it, so that only the flapping of an ear or a glint of sunlight on an antler's prong betrays the fat buck at breakfast."[116]

W. E., of Roanoke, N. C., writes concerning the Deer in his park: "I feed them on Indian meal, having found by experience that raw corn is apt to swell and kill them. One quart of meal per day is sufficient to keep a Deer always fat. They are very fond of sweet potatoes, which they will eat though half rotten; they like the leaves but not the roots of turnips."[117]

Summarizing the food habits for the benefit of the Deer farmer, Lantz says: "In captivity, Deer eat almost every kind of vegetation, including all sorts of garden stuff. They are fond of acorns, beechnuts, chestnuts, and other mast. Lily pads, fallen leaves, lichens, and mosses are freely eaten; so that, with plenty of range and an abundant variety of plants, there is little difficulty about food for Deer.

"A good supply of running water must be provided, and the animals should have access to rock salt. If the browse and pasture are scant, some grain should be fed even in summer, and it is best to feed regularly in winter. Of the grains, corn is generally recommended; there is no waste in feeding it, as Deer pick up every grain. Coarse hay full of weeds is preferable to timothy or other tame hays, except alfalfa. Of clover hay, Deer usually pick out the dry flower heads greedily, but waste the other parts. In the northern half of the United States, winter shelter should be provided for Deer."[118]

There are few vegetable substances in their native haunts that are not entered on the diet list of the Deer. Poison plants, toadstools, fungi, berries, have not yet been reported; and pine boughs, or indeed those of any evergreen tree, are little sought for, or wholly neglected when other foods are at hand.

But their choice above all others, is nuts. Late September is the season of nuts, and nuts are to the Deer what honey is to the Bear. Acorns in

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[116]Marin, Forest & Stream, July 8, 1899, p. 22.
[117]Raising Deer, p. 41.
[118]As above, p. 47.

particular are their delight, and groves of oaks become a daily haunt of the reunited family. The effect of such rich food in quantity is quickly seen.

"Indeed," says Caton,[119] "it is astonishing to see how rapidly a buck and a doe will improve so soon as the acorns begin to fall. Ten days are sufficient to change a poor Deer to a fat one, at the time when the summer coat is discarded and the glossy winter dress appears."

In view of this Deer's fondness for acorns, it is interesting to note that in Sargent's map[120] the distribution of oaks in America east of the Rockies coincides closely with the range of the Whitetails.

As Fish-eater

Most animals that we have considered, are nearly omnivorous, and even this Deer, although supposed to be a typical herbivore, makes a bold approach to a wholly inclusive diet. The greatest surprise in this connection is the fact that it sometimes eats fish.

Miss Minnie Moore-Willson, of Kissimee, Florida, tells in full the story of her pet Whitetailed Deer, and its singular tastes in food. "But," she says, "the greatest surprise in her eating was yet in store for us. Day after day, the minnows, kept for the herons, would be missing, but who was the culprit? Nannie had been seen at the tub, but then, 'Nannie wouldn't eat minnows.' One day, a boy brought a fresh lot of minnows, and the Deer seemed excited over the contents of the bucket; he quietly and without thought handed her a fish, and she ate it ravenously and begged for another, and so on till we called 'enough'—but the minnow thief had been discovered."[121]

This was a hand-raised captive, therefore possibly of morbid or unnatural appetites. But such an explanation would not apply to the cases cited by Thornton W. Burgess, the well-known nature-writer. A fair-sized trout had been stolen from the camp, and the only clue to the thief was Deer tracks at the place. Later, the Deer appeared as though looking for more.

"Sure enough," says Burgess, "there stood a 3-year-old buck, watching with interest our activity. He was not over 40 feet away. Mitchell tossed him some bits of corn bread, and he finally came within 20 feet.

"Shortly after this, the other members of the party arrived, bringing some more trout. These were dressed together with those we had brought

[119]Ant. & Deer of Amer., p. 308.

[120]Atlas, Rep. Forest Trees N. A., 10th Census Office U. S. Dept. Int., 1884.

[121]Forest & Stream, Jan. 7, 1899, p. 7.

in, and the heads and entrails thrown into the brush a short distance from the camp. That buck came in and cleaned them up, thus adding proof to the evidence of his footprints beneath where the first trout had hung.

"One of my companions had had a similar experience. This was at Allegash Lake in Maine. This time it was a doe. She had hung around the camp until she had become fairly tame. One afternoon he came in with a dozen or more small trout in his canoe. He drew the canoe up on the bank, and went up to his tent. He came out just in time to see that doe take the last of his catch. Another party had a similar experience at that same lake. Probably it was the same animal."[122]

Voice

The Deer is generally considered a very silent animal; yet the list of its noises increases with fuller observation.

Bachman, after a lifetime of experience, and with abundance of opportunity, writes: "The Deer is one of the most silent of animals, and scarcely possesses any notes of recognition. The fawn has a gentle bleat that might be heard by the keen ears of its mother at the distance, probably, of 100 yards. We have never heard the voice of the female beyond a mere murmur when calling her young, except when shot, when she often bleats loudly like a calf in pain.

"The buck, when suddenly started, sometimes utters a snort, and we have at night heard him *emitting* a shrill whistling sound, not unlike that of a Chamois of the Alps, that could be heard the distance of half a mile."[123]

"In riding through the woods at night in the vicinity of Deer, we have often heard them stamp their feet, the bucks on such occasions giving a loud snort, then bounding off for a few yards, and again repeating the stamping and snorting, which appear to be nocturnal habits."[124]

They have also a louder, coarser snort of challenge, as noted by A. McLane in *Forest & Stream* (Aug. 10, 1895). Corroboration of this is offered by my Mattawa guide who described the challenge as resembling the bleat of a Sheep.

Franklin T. Payne tells of[125] some park bucks that he shipped as "bawling with rage when captured."

"In all my experience," says A. Y. Walton,[126] "extending over about 40

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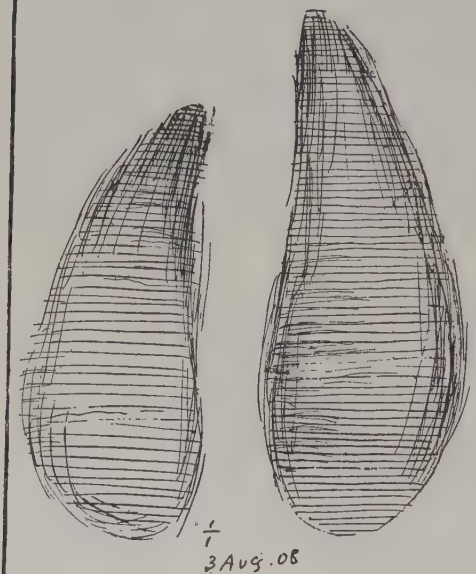
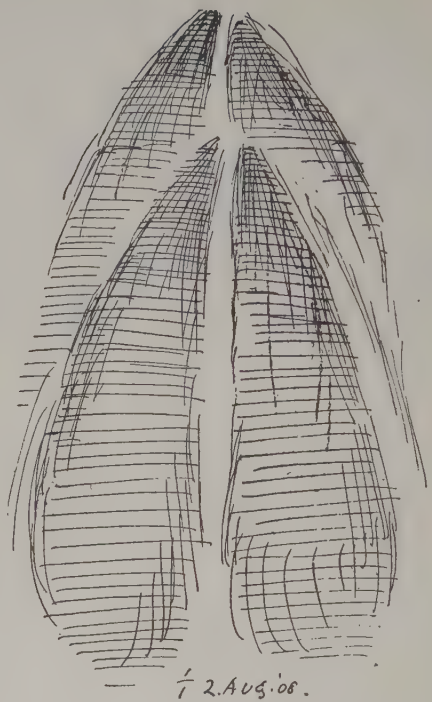
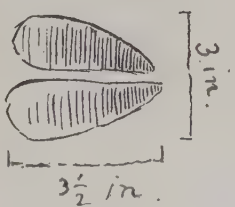
[122]Journ. Mamm., Feb., 1924, p. 65.
[123]Q. N. A., II, pp. 226–27.
[124]As above, p. 229.
[125]Recreation, May, 1898, p. 377.
[126]Deer Texas, p. 485.

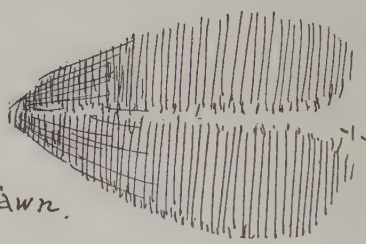


Odd toes

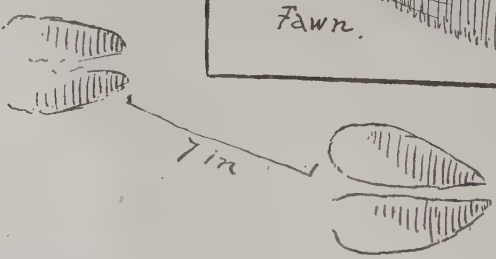


Showing exact register.





Fawn.



Kineo, Me
23 Aug: 1918.

F T.S.

Plate XLIV — Whitetail Tracks

years, I have never but once heard a Deer make use of the voice when seeking a lost mate. This occurred when, upon one occasion, having shot at and scattered a band of stags, one of the number, not having seen or scented us, turned back, evidently seeking his leader, and passed close by, making a low, muttering noise like that sometimes uttered by the domestic ram."

Commenting on the above facts, Ernest McVeigh, of Ottawa, Ont., writes me on Oct. 19, 1906:

"My experience of Deer has been pretty much confined to the Province of Ontario, ranging from the Georgian Bay to Montreal; and I have noted all of the sounds mentioned by you. But two or three years ago, I had a new experience. I went up the Gatineau, in the Province of Quebec, for a few days' hunting; and in discussing the hunt with our host, whose experience of Deer had been confined to his immediate surroundings, I was struck by his remark that he 'heard the Deer bleat as they came up through the valley ahead of the Dog.' I asked him to explain, as this was new to me, and he informed me that nearly all Deer in his country did this when chased by Dogs, as well as when disturbed by hunters. During my stay I saw Deer, both chased by Dogs and started by hunters, that did not bleat; but I also had the good luck to hear and see some that did. . . .

"One of my friends shot at a Deer down in the valley, and started a bunch of 5 that went up over a smooth-top hill about 800 yards from me. I should not have noticed them had it not been for the loud and continuous bleat they emitted as they went. The word 'bleat' does not quite describe the sound, as it was as much a bellow as a bleat, being a deep, throaty, continuous noise that seemed to fill all surrounding space for, I should judge, at least 1,000 yards; and to make the thing more peculiar, they went in single file and *trotted with flags down*, as Moose might have done. I had a good view of them, and they were ordinary Whitetailed Deer. But to remove any doubts of that, my friend managed to get a second shot and dropped one of them (a 160-pound buck), which did not differ in any way from others of his kind.

"Whether this phenomenon is peculiar to the district referred to or not, I cannot say; but my friend stated that both bucks and does had this habit."

In the section on "War Cries and Signals," is set forth the fact that in the autumn the bucks challenge with a loud bleat or bawl.

His Deadly Enemies

The greatest enemy of the Whitetail is the buckshot gun; with its unholy confederates, the jacklight and canoe. Next comes the repeating rifle of the poacher and pothunter.

I hope and believe that a very few years will see them all totally done away with in Deer sport—classed with, and scorned like the dynamite of the shameless "fish-hog," mere variants of the loathsome "hogomy."

The third enemy is deep snow. It is deep snow that hides their food, that hinders their escape; that brings them easily within the power of the Wolves, and of the Cougar on its snowshoes, and of the human Cougar who is similarly equipped for skimming over the drifts.

Another deadly peril from the snow in a hard winter is set forth by Raymond S. Spears.[127] After pointing out that the heedless burning of forests had destroyed the winter cover of the Adirondack Deer, he says:

"Perhaps the worst sight of all was that of Deer with 'saddles' of snow on their backs. The snow froze to the hair of the animals, which did not have life enough to melt it. The saddles grew larger and larger on scores of Deer, until the victims finally succumbed."

Wolves, too, rank high in the list of the Whitetail's foes, and have long played seesaw havoc with the Deer in the North. On the upper Ottawa, the Deer came in with the settlers. The Wolves followed, because in the Deer they found their winter support. In summer, the Deer were safe among the countless lakes, and the Wolves subsisted on what small stuff they could pick up in the woods. But winter robbed the Deer of the water havens, deep snow robbed them of their speed; and then the Wolves could run them down, so wintered well.

But wintering well meant increasing, and the Wolves became so numerous that they destroyed their own support; then starvation, followed by extinction, was their lot. Again the Deer recovered locally or drifted in from other regions, and again the Wolves increased to repeat their own destruction. This has been the history of the Deer population along most of our frontier wherever winter is accompanied by deep snow. If we could exterminate the Gray-wolf, we should half solve the question of Deer supply; but there is no evidence that we shall ever succeed in doing this.

However, I find one experienced old hunter, E. T. Merrill, of Reed City, Mich., who has little faith in the stories of Wolves running down Deer. He says:[128] "I have not yet seen the race between Wolves and a Deer that lasted over ten minutes. Either the Deer gets to water or some clearing or road where the Wolves will not follow, or else he is killed at once. Very often they drag a Deer down within a few jumps of where he starts.

"In Michigan and Wisconsin, during winter, Deer generally feed along the edge of a swamp under thick hemlocks where there is plenty of

[127]Sat. Eve. Post, Jan. 26, 1907.

[128]Sports Afield, March, 1900, p. 229.

ground hemlock, and the Wolves generally come in on them from two ways, and drive them toward the swamp; and they will nearly always kill them within 40 rods of where they start."

This is readily understood in country where Deer and other game animals abound. The Wolf knows very well that the Deer is far fleeter than himself and that, if he fail in that first dash, it is easier to go elsewhere and try to surprise another Deer. But when desperately hungry, in regions where Deer are not so plentiful, a Wolf will stick to any Deer it starts, and will follow it to a finish, however far. I have heard accounts of many old Ontario hunters that entirely support this belief. These facts, it will be seen, are not opposed to those advanced by E. T. Merrill.

Shiras tells me that in the spring of 1906, he examined carefully a cedar swamp in Alger County, northern Michigan; and found, within a radius of three miles, 325 carcasses of Deer killed by Wolves during the past winter.

A Brave Buck

In the *Sportsman's Review* for Dec. 26, 1908, p. 713, is a thrilling account by Robert Anderson of a woodland tragedy. In the snow, he found the carcass of a Deer, and about it were 3 dead Wolves, evidently killed by the hoofs of the buck. This was at Biwabik, Minn., near Markham, on the old Vermilion Road.

Dogs and Deer

Nigh kin to the Wolf is the Dog; and less destructive individually because less brave and powerful; but more destructive in the aggregate because so much more numerous. The estimated Dog population of the United States is 7,000,000. One quarter of these are able and ready to kill a Deer. There can be no doubt that a vast amount of the Deer destruction ascribed to Wolves is the work of Dogs, especially in the Western States.

The following case is a sample of thousands that might be offered: "William Harris, who lives in the Wickopee Hill district in West Brattleboro, [Vt.] found the body of a large doe in his pasture recently, partly eaten up by Dogs. Mr. Harris immediately reported it to County Game Warden R. L. Frost, who upon investigation, said it was evident that the doe had been killed by Dogs. The snow being deep now, it is hard for the Deer to make a good escape."[129]

A thrilling account of a helpless Deer hunted and torn by a savage

[129]Forest & Stream, Feb. 5, 1910, p. 219.

half-breed bulldog, is given by W. Todd of Richmond, Va. In its dire extremity, this Deer came to the man for protection.[130]

The vast damage of the self-hunting Dog—and all Dogs are such, if loose at night—is set forth in *Forest & Stream* (May 28, 1910, p. 856), by "Orange" of Milford, Conn. He describes the killing of a doe heavy with young (May 21st) by the nightly prowling Dog. These Dogs never face a buck if he shows fight, but are delighted to pursue a doe who is about to become a mother, and therefore harmless and helpless. No man is a considerate neighbour or a good citizen who lets his Dogs run at night.

Foxes and Deer

It seems likely that Foxes will kill the very young fawns if they find them unprotected. There is, at least, good evidence that the Deer reckon the Fox as one of their foes.

Wm. G. Rockefeller tells me that about Nov. 1, 1904, as he was still-hunting in the Adirondacks, he came on a Deer that was leaping about in an extraordinary way. On getting near, he found it a doe in pursuit of a Fox. The Fox was running and dodging under logs or any other cover he could find; but the doe was intent on killing him, and would have succeeded, doubtless, had not my informant interfered by shooting the Fox. The doe was closely followed by her fawn of the year.

This same sportsman knew of a buck that discovered a Fox held in a trap. The Deer, promptly taking advantage of his enemy's distress, tried to kill the Fox; but in some unknown way, released it—probably by stamping on the spring; and Reynard made good his escape.

The Special Correspondent of the *Phillips Phonograph*, Nov. 3, 1899, writes from Norcross, Me., Oct., 1899, that Frank "Sewall and Dave White found 6 Deer in one yard that had been killed by Foxes; and in one day at another time, 3 that had come to an untimely end by the same means were seen. This destruction goes on during the extreme cold weather of January and February, when there is no crust and the snow is very deep."

This I have not investigated. Possibly the Foxes were Fishers.

Deer and Rattlesnake

The ancient feud between Deer and rattlesnake is well known on the Plains. My old friend, Dr. Charles A. R. Campbell of San Antonio, Tex., gave me in Nov., 1920, an account of an affair that, in various forms, has often been recorded. While hunting in Coahuila, Mex., in the late

[130] Forest & Stream, Nov., 1904.

'70's, he saw a finish fight between a buck Whitetail and a rattlesnake. The buck approached the buzzing reptile with horns presented and with head down and sideways, so it could watch the rattler. The strike of the snake was received on the horns; then, in a flash, the buck sprang and landed on the snake with all four feet together, instantly bounding off. After a few of these charges, the snake was cut to ribbons

Flies and Other Parasites

Mosquitoes, ticks, and deer-flies are also among the foes of the Whitetail. Mosquitoes bother them just as they do us. At times the Deer avoid these plagues by sinking themselves in the mud and water. Blue-ticks of the genus *Ixodes* are very troublesome; and G. M. Martin tells me that in the Adirondacks during June and July, he has often seen these hanging on the Deer's legs, sucking their blood. The ticks do not cause the Deer much annoyance, but must be a great drain when present in large numbers; possibly also communicate disease. The deer-flies (*Oestrus*), however, are the most annoying of all these small enemies.

Catesby says:[131] "Near the sea, the Deer are always lean and ill-tasted, and subject to botts breeding in the head and throat." Hunters assure me that this same complaint is found among Deer in the North.

R. Clarke Fisk writes me that in Montana, on Sept. 9, 1898, he "shot a young Whitetail buck whose horns were in full velvet. He was fat; but in his liver, I found two large worms curled up. They were not unlike skin botts."

In the country about MacDonald Lake, in the Adirondacks, G. M. Martin tells me, Deer are often seen with warts on the legs and belly. Some of those observed were an inch across and one inch high. In the Rockies, I found the Mule-deer much infested by hydatid cysts. I expect that the same will prove true of the Whitetail.

Accidents

Many a man, on first seeing a Deer dash through the dangerous, mazy wreck of a storm track, has wondered how it could escape with its life. As a matter of fact, Deer suffer many accidents in their haste. I suppose that not one adult in ten has escaped being snagged many times, as shown by scars on legs and belly.

One very strange case of the sort is recorded from Montana by R. Clarke Fisk.[132] He shot a doe Whitetail that had a "fir branch over a foot

[131] Nat. Hist. Car., Flor., Bah. Ids., II, 1731, p. 43.

[132] Outdoor Life, Dec., 1898.

long, and over half an inch thick" driven into her body. It had entered between the fourth and fifth ribs on the right side, missed the right lung, pierced the top of the diaphragm and the point of the liver, and rested against the under side of the backbone. "That the animal met with this accident while it was yet young," says Fisk, "I am thoroughly convinced, for the end at the ribs had been entirely drawn into the opening of the heart and lungs, and had thoroughly healed on the outside. The skin, which I now have, shows only the faintest trace of a scar. There was not a particle of pus or inflammatory matter of any kind. In fact, the branch, covered as it was with the white skin, exactly resembled one of the long bones of the leg. The animal was healthy, and fat, and the meat was fine." (See Plate.)

Charles A. Gianini, of Poland, Herkimer Co., N. Y., reports a similar accident. He writes: "Last fall while hunting in the town of Wilmurt in the West Canada Creek country, we secured a 2-year-old buck; and on dressing him out, we were surprised to find driven into his chest a piece of poplar limb. . . . This piece measures $5\frac{1}{2}$ inches in length and $1\frac{3}{8}$ inches in diameter, and when found in the beast was encased in a sac of tissue. On the outside of the Deer's chest there was no sign or scar showing where the wood had entered. . . . The . . . Deer was apparently healthy and seemed to be in no way affected by this accident."[133]

Still another case is reported from Trumbull, Conn., by Wilbur F. Smith of South Norwalk, Conn.

"The doe and a fawn of the year were seen in the fields on Sunday, and on Tuesday the doe was found in an alder patch, dead. From the position of the body it was plain that she had jumped the wire fence from the road, and had caught on the top wire, pulling the staple and sagging the wire. The strange thing was that in falling forward, she had struck on an alder stub, which was thrust down her throat, and had evidently caused sudden death, as there was no sign of a struggle. . . . I saw the Deer later, and noted that the windpipe was broken and lacerated. . . .

"Another doe and fawn entered a farmyard the same week, and when the children went out to look at them the doe jumped the heavy wire fence and started off. The fawn tried to follow, and plunged into the wire two or three times. She got her leg through the fence, badly injuring it, and plunged into the fence again and dropped dead almost without a struggle."[134]

Arthur F. Rice, of the Camp Fire Club, writes: "Some years ago, a very reliable guide with whom I was hunting in the Oswegatchie country told me

[133]Forest & Stream, April 8, 1911, p. 535.

[134]Forest & Stream, Nov. 4, 1911, p. 679.

of following a Deer, which he had jumped in the heavy undergrowth, and finding blood, although he had not fired his rifle. He finally overtook and shot the badly wounded animal, which had a deep gash in its chest.

"Retracing the course of the Deer, he found that in leaping into the brush, it had impaled itself on the dry, spear-like branch of a fallen tree.

"A friend of mine, who has a camp at Madewaska, in the Adirondacks, while hunting saw the antlers of a buck that was apparently lying down in the edge of a marsh, but found on closer inspection that he was mired up to his neck, and had evidently been there some time. My friend laid down some poles, and, getting his belt around the buck's horns, managed, through the animal's struggles and his own, to pull him out. Covered with mud, almost dead from thirst and unable to stand, he was a pitiable sight, but greedily drank water brought to him in a hat, and after a time recovered sufficiently to stagger off into the woods. . . .

"Still another instance has come to my notice where a doe lying under a tree with exposed roots, had somehow slipped a hind leg under one of these, beyond the gambrel joint, and was unable to get up, being finally liberated by a hunter who didn't want to get his meat that way."[135]

Enos A. Mills writes: "Deer, Elk and Mountain Sheep are occasionally caught in deep snow, or are struck by a snowslide. A number sometimes are snowbound or killed at one time. Usually the prowling Wolves or Coyotes discover the kill, and remain near, as long as the feast holds out.

"Once I knew of a number of Wolves and two Lions lingering for more than two weeks at a wreckage brought down by a snowslide. . . . I found that from 15 to 20 Deer had been swept down by the slide and mixed with the tree wreckage."[136]

The editor of *Forest & Stream* says: "Hundreds of wild Deer as well as much smaller game, have been killed by the floods in the Mississippi valley, and hundreds more are now starving in the overflowed territory, according to reports received by the American Game Protective and Propagation Association of New York; 170 Deer are marooned on two mounds in the submerged Sunflower River district a few miles from Vicksburg, Miss."[137]

Disease

Many years ago, tuberculosis broke out among the Deer of a certain section of New England and, according to the late Jenness Richardson,

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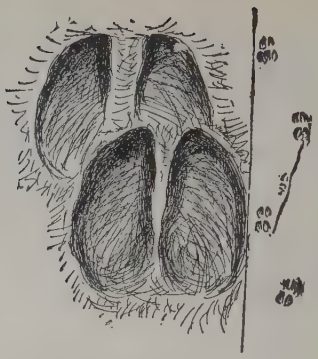
[135]Field & Stream, May, 1920, p. 29.
[136]Watched by Wild Animals, 1922, pp. 172–73.
[137]Forest & Stream, May 18, 1912, p. 629.

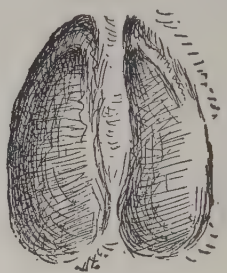
Sheep tracks, front and hind, different sized Sheep



Right feet of Pig. Aug. 6, 1903

No clouts. Mud, one half inch deep

A. Hind foot of Whitetail buck at full speed. B. Track of right fore foot—5½ inches in length



Doe track

Tracks of Whitetail. Quebec, Sept. 15, 1905

A. Buck running after doe. From A to D he cleared, at one bound, 15 feet, and passed over the log X where it is 4½ feet from the ground. B. Doe, coming dripping out of the water, steps here about 18 inches; farther on she trotted and the steps are 2½ feet long. Her tracks register well; that is, the hind foot falls in the mark of the front foot. C. A half-grown fawn with the doe. For some reason its tracks do not register at all. Registering is better walking and especially lends silence to the tread.

PLATE XLV.—ODDS AND ENDS—WHITETAIL

destroyed many. It was a common thing in the evening, he said, to hear the Deer coughing in the woods. E. T. Murch, of Bangor, Me., tells me that in 1901, there was much lung trouble among the Maine Deer. The victims were usually the older ones.

At Woburn Abbey, England, I learned from the Duchess of Bedford that many Virginia Deer have died there of a parasitic disease of the lungs and stomach.

There have been, doubtless, many destructive epidemics among the Deer of America; but the right conjunction of disease and bacteriologist has not yet occurred, so that we have no authentic details. In this connection, Judge Caton's observations on the Deer in his parks are the best available. He says[138] "that they are liable to distempers in the wild state, either epidemic or contagious, which sometimes carry off great numbers, we may not doubt, as we sometimes receive pretty well authenticated accounts of such calamities. Such accounts as I have noticed have, however, been confined to the Virginia Deer. . . .

. . . . . .

"I have lost many Virginia Deer with a swelling under the lower jaw. It commences two or three inches back of the chin, and finally swells out as to involve the whole head below the eyes; sometimes it gathers in a sac of half an ounce of pus-like matter, one of which I opened, but the Deer died. I never knew one to break itself. When the tame Deer are attacked with this distemper, and it is observed in time, I have never failed to cure it. If, when it first appears, it is examined, a small, hard kernel is found just under the skin. If this is then cut out, the Deer gets well at once. Later, the lump seems to be dissipated, but if the swelling has not extended above the lower jaw, though it may be three inches long, and the protuberance an inch thick, and really has an alarming appearance, a deep central incision an inch or more long has always proved effectual.

"But as only the tame Deer, which can be caught, can be treated, all the wild Virginia Deer which have been attacked, so far as I know, have died. In the early part of my experiments, this disease was much more prevalent than in later years, and so I conclude that those more remotely descended from the wild stock are the least liable to it. It only attacks the adults, or those more than two years old. . . . I have no account that this disease has ever been observed among the wild Deer of the forest; certainly I have never seen one afflicted with it."

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[138]Ant. & Deer, pp. 341–43.

Writing of the Whitetail in Texas, A. Y. Walton says:[139] "They continued to be very abundant in all the country towards the coast until 1856, when an epizootic distemper, called 'Black tongue' broke out among them and killed them by the thousands. I have known this disease to occur in Louisiana and Texas, and have examined subjects affected by it. The most marked symptoms seem to be a general emaciation and wasting away of the system, a mucous discharge from the nostrils, and a sloughing of the hoofs, all evidently accompanied with a fever and thirst, for the dead were found mostly at or near the water."

C. H. Roseberry, of Stella, Mo., writes, concerning the Deer in his park: "From 1891 to 1901, I lost every year from disease an average of 20 per cent. The climax came in the drought year of 1901, when my loss was 50 per cent. from the disease known as 'black tongue.'"[140]

See also "Blacktail " for outbreak of Foot and Mouth Disease.

Hoofs of Deer Shed. "*Wananish, N. C., Dec. 4.*—In a recent camp hunt near here, we killed 18; all of the grown ones had gone through some disease that caused the hoof to shed. In some cases, the old hoof still telescoped on the new one.

"The Deer were in rather better flesh than usual at this season of the year.

"I heard of some new finds of dead Deer in the woods during the past summer; but evidently only a few died, as they seemed fairly plentiful in our territory. We only found the skeleton of one which probably died from the disease.[141]

A Red-deer that lost his hoofs through disease is mentioned in the Wapiti Life, section on "antlers."

"*Fibroma in a Virginia Deer.* While hunting the past season, it was my fortune to kill a doe Deer afflicted with a type of tumour. The Deer was fat, and looked to be in good healthy condition. Had apparently had young, as there was milk still in the bag. There were several tumours attached. The largest of these was attached just forward of the left shoulder near the top of neck possibly two inches below the top of spine. The second in size attached to the side of one of the udders. A third, the size of a goose egg, was attached to the bag, and several the size of a walnut to the bag and flank. The larger were of cauliflower growth, and conical in shape, the smaller ones apparently solid and egg-shaped."[142] The specimen was examined by Prof. C. F. Jackson.

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[139]Deer Texas, p. 485.

[140]Lantz, Deer Farming, p. 16.

[141]J. P. C., Forest & Stream, Dec. 29, 1906, p. 1025.

[142]E. C. Berry, Game Warden, Conway, N. H., Journ. Mamm., May, 1925, p. 130.

Age

To what age does the Whitetail attain, bar all these diseases, accidents, and overstrong enemies? Applying the rule of 5 times the years needed for full growth, we expect that 10 to 15 years would be its span of life. The prime is at about 7 or 8. Then its powers are at the highest; and the outward and visible sign thereof in the bucks—the antlers—are at their best.

In parks, where they are protected from the common dangers of their race, "they live from 20 to 25 years."[143]

This, however, is abnormal. In a state of nature, they are on the down grade at 10; and few are likely to escape their natural enemies after once their powers begin to wane.

Eyesight

The hearing and scent of Deer are marvellously acute, but their eyesight is not of the best. Bachman considers it actually imperfect; stating as proof that[144] "we have often, when standing still, perceived the Deer passing within a few yards without observing us; but we have often noticed the affrighted start when we moved our position or when they scented us by the wind. On one occasion, we had tied our Horse for some time at a stand; on his becoming restless, we removed him to a distance. A Deer pursued by Dogs ran near the spot where the Horse had originally stood, caught the scent, started suddenly back and passed within a few feet of the spot where we were standing without having observed us."

This animal seems, indeed, to regard all motionless objects down wind as mere features of the landscape. Hunters take advantage of this weakness, when stalking it in the open. They run toward it without concealment as long as it is grazing; but the moment it shows, by shaking its tail, that it is about to raise its head, they "freeze," crouching low and still. The Deer takes its customary look around, and lowers its head to feed again; whereupon they repeat the open approach, and thus continue until within easy shot.

Col. Theodore Roosevelt observes:[145] "I cannot say whether the habit is a universal one, but on two occasions at least I was able thus to creep up to the feeding Deer, because before lifting its head, it invariably shook its tail, thereby warning me to stay without moving until it had lifted its head, scrutinized the landscape, and again lowered its head to graze. The eye-

[143] R. H. Harris, quoted in Lantz, Raising Deer, p. 44.

[144] Q. N. A., II, p. 227.

[145] Deer Fam., 1903, pp. 96–97.

sight of the Whitetail, as compared with that of the Pronghorn Antelope, is poor. It notes whatever is in motion, but it seems unable to distinguish clearly anything that is not in motion. On the occasion in question, no Antelope that I have ever seen would have failed to notice me at once and to take alarm. But the Whitetail, although it scrutinized me narrowly, while I lay motionless with my head toward it, seemed in each case to think that I must be harmless, and after a while, it would go on feeding. In one instance, the animal fed over a ridge and walked off before I could get a shot; in the other instance I killed it."

I have heard of this trick often, and have several times proved it a failure with Antelope. I never tried it on Whitetail Deer, but did it with complete success on a pair of Red-deer in Europe some years ago.

The Tail and What It Tells

It is significant that each of our small Deer is named for its tail. While this wonderful member serves the creature as a mode of expression and a flag for signalling, it incidentally informs us at the same time, if we are wise in the wood-way.

In the incident given from Colonel Roosevelt's pen, we have an excellent illustration of this.

Discussing the tail as an organ of expression, Rutledge says: "Some hunters claim that if a Deer slaps down his tail at the crack of the gun or of the rifle, he is reached; but on a good many occasions I have seen mortally wounded Deer sail off in grand and standard style. Some of these were actually shot through the heart."[146] All agree that the movement of the tail is significant. Rutledge proceeds to relate the story of a buck killed by his brother.

The hunters mortally wounded a buck which disappeared. "As the buck was making off painfully, he had his tail mashed in tight against his haunches; and at every effort, the tip of it would be flicked like that of a Goat. . . . Both my brother and I were of the opinion that such a tail-motion was an infallible sign of a serious, probably mortal wound."[147]

Swimming

In the water, Whitetailed Deer are very much at home. They can go so fast that a canoe-man must race to overtake them; this means that they can swim for a time at four miles an hour. They are, indeed, so confident

[146] Wildwood Sport, p. 484.

[147] As above.

of their swimming powers that they invariably make for the water when hunted to extremity. There are many cases on record of Deer so pushed, boldly striking out into the open sea, trusting to luck for finding another shore.

There are details[148] of a Whitetailed Deer captured at sea near Portland, Me., five miles from shore; and another[149] of one taken a mile and a half from Sachuest Point, R. I., as it was swimming at full speed *away from land.*

In regions where there is plenty of open water, the Deer have little to fear from Wolves, and nothing at all from unaided Dogs. In summer, a Deer swims low in the water, showing little more than its head; and when shot, it usually sinks. In the late fall, it swims much higher, showing the back. This is due partly to the recently acquired fat, which has added more to its bulk than to its weight; but chiefly to the growth of the coat, each hair of which is a little barrel of air adding its flotation to the Deer. As Merriam says:[150] "When the blue coat, which grows very rapidly, is an inch in length, it will, as a rule, float the Deer that carries it; and this length is generally obtained about the first of October."

It is a remarkable fact that in winter, when Deer are hard pressed by Wolves, they will often make for some lake that has furnished a safe haven in summer time. But when covered with ice, it may prove their undoing, for on it the Wolves have the advantage. Their pads and claws hold better than the Deer's hard hoofs; the Deer is speedily overtaken and devoured.

Speed on the Run

The ordinary gait of the Deer is a low, smooth bounding, with an occasional high jump.

There are not many data on record for gauging the speed of this Deer. We know, however, that it can run away from Wolves that go at the rate of about 20 miles an hour; and from hounds that go perhaps 22 miles an hour; but that in the open, it is soon caught by greyhounds that go at the rate of 30 miles an hour. Once or twice I have seen Deer get on the track ahead of a train. If the train is going 30 miles an hour, the Deer cannot long keep ahead; they must dodge off or be killed.

From these facts, I should argue that this Deer can travel at the rate of 25 miles an hour, but cannot keep it up for more than 3 or 4 miles.

The ease with which the animal covers great spaces is marvellous. I have known a buck to clear a 4-foot log and 15 feet of ground in one leap.

[148]Forest & Stream, Dec. 6, 1883, p. 362.
[149]Forest & Stream, April 4, 1896, p. 272
[150]Mamm. Adir., p. 130.

The occasional high jump, like the spy-hop of Jackrabbit and Springbok, is intended, no doubt, for purposes of observation.

In Deer parks, especially small ones, it is necessary to make the fences 8 feet high to keep in the Whitetails. But even this they will clear at times, if put to it by terror.

W. P. Lett, the Ottawa naturalist, writes: "A large Virginian Deer can leap from 17 to 20 feet, and keep up the gait for a considerable distance when freshly started, with the matchless chorus of the hounds behind him. About six years ago, I had the curiosity to measure a single bound of a fine spike-horned buck, after it had rushed down the steep side of one of our own Laurentian hills before the hounds; and I found that, from the spot whence it had started to the point where its fore feet struck the earth again, the distance was 111 feet, or 37 yards. The descent or grade was, of course, exceedingly steep."[151]

Before the Hounds

Those of us who form our idea of hounding by certain well-known pictures and accounts, may be surprised and enlightened by reading the following from the pen of A. Rutledge:

"During all my years of deer-hunting [about 30], I have never more than two or three times seen a Deer in full run before Dogs, and in each case the Deer was wounded, and was about to be overhauled. In front of hounds, Deer will gracefully loaf along, skulk, dodge, make a showy spurt or two, and make some spectacular jumps over obstacles; but most of the wild races that are supposed to take place, never really come off."[152]

That is to say, the Deer is so much swifter than the hound that he does not put forth his full strength or show his best speed. He feels he can control the game, so plays with the Dogs.

The Crafty Old Buck

The cleverness of the old Whitetail is attested by all. The old buck especially is wise in caring for his skin. Unlike Moose, Elk, or Mule-deer, he rarely flies in open retreat when he senses danger.

Rutledge writes: "I think there is no other creature so large which lives so silently, secretively and effacingly. Many a time Deer will live close to settlements, yet their presence may for a long time be unguessed. They are by no means shy of noises when they understand them. I re-

[151]Ott. Nat., Vol. I, 1887, p. 127.

[152]Dixieland, p. 56.

member well with what misgivings I once saw a sawmill erected near the end of one of my favourite Deer drives. Yet, despite all the howling of the mill, the shouting of the teamsters, the hammering and pounding about the mill yard, the Deer soon became accustomed to the racket.

"About two months after this particular mill was established, I started as many Deer as usual in its vicinity; one old stag I bounced out of the bays not more than 100 yards from the mill.

"I once knew of a herd of about 7 Deer that lived in a strip of woods between two settlements and they fattened on the crops of both communities."[153]

So also testifies T. S. Van Dyke. Most wild animals, he says, "rely on keeping as far away as possible from every trace of man and all his works. But the Deer will lie all day within sound of the axe, and cares nothing much for the sound of the gun if not too close."[154]

Rutledge continues: "All this proves that the Whitetail is a remarkable skulker. More Deer escape enemies by skulking than by running. In fact, a Deer does not readily run and jump. It can and will; but if let alone, it will just steal along noiselessly, push its way cautiously through bushes, float lightly over obstacles, wander delicately through the lonely night forest.

"In most cases, unless hard pushed, a Deer will run under an obstacle where possible in preference to leaping it. I have repeatedly seen Deer run under a strand of barbed wire not more than $2\frac{1}{2}$ feet off the ground, and have observed them do the same thing under a hurricane-thrown log.

"Of course, sometimes the grand show or main circus comes off: a Deer will set sail (the Negroes of the plantation say 'ca' sail,' meaning 'carry sail'), that white banner will be stiffly erected, and of all the running and jumping you ever saw in your life, a genuinely startled buck or doe will show it to you."

The Spy-hop. "Occasionally a Deer when first started—and this applies especially to a wise old stag—will take one tremendous leap as if to get his bearings from an elevation. I have seen this done but twice, and I have seen hundreds of Deer start from their beds. Some hunters claim that it is a special manœuvre. I have never been able to decide whether it is that, or merely a major reaction from a man-size scare. Whatever it may be, it is one of those sights that is genuinely memorable among woodland pictures."[155]

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[153]Wildwood Sport, p. 485.
[154]Find Deer, p. 206.
[155]Wildwood Sport, p. 485.

Tricks in Hiding

Says Rutledge: "A Whitetail, especially an old buck, may lie very close if he thinks he may be passed over. . . .

"While walking to my stand through comparatively open woods, my attention was attracted to some movement under certain oak bushes to which the dead leaves were still clinging. There lay a 10-point stag; he wasn't lying normally, but was crouched as a Dog often lies, with his feet extended in front of him. His head was flat on the ground. This he turned slightly to keep a wary eye on my approach. It was the rocking of his horns that I had seen. Had I not seen him, he probably would have let me pass, and then he would have slunk away on my backtrack.

"Before jumping, a Deer often assumes this crouching position if it is aware of the approach of an enemy; and that is certainly one reason why it can make amazingly long leaps apparently out of its bed. It does jump from its bed, but it is all set for the performance.

"Once again I saw two old does crouching in the manner just described, but they had half risen and appeared to be undecided whether to go or stay. I passed them just to see what would happen. They simply subsided into their beds again. A doe always appears more unsuspicious and unwary than a buck; in such a case, a stag would probably have left the neighbourhood."[156]

When Jumped

"After a Deer is out of its bed, its behaviour is usually characteristic. For a short distance, it may make a mighty show of record-breaking running, dauntless tail flaunting high; and may give all other signals of a last and long farewell to the hunter. But don't let that Deer fool you. He is only showing off. In the first place, he has a definite range, which is moderate in size, and he hates to leave this. Again, he would much rather skulk than run. How far he will go, will depend on how badly he is frightened, and also on what kind of cover is afforded near by. Many a time I have known a Deer to stop within 200 yards of his bed whence he had been started. After stopping, he is going to stand and look about for a while—possibly a good while. Then he will creep and mosie his way into some snug thickety corner; and when he considers that your memory of him has failed, he's going to lie down again and finish chewing his cud.

"Occasionally, when a Deer is started, he will slip out craftily, stealing on his silent Cinderella feet to the thicket edge; once there, he will give things

[156] Wildwood Sport, p. 508.

PLATE LVIII.—MULE-DEER FAMILY IN WINTER QUARTERS

Photograph by E. T. Seton

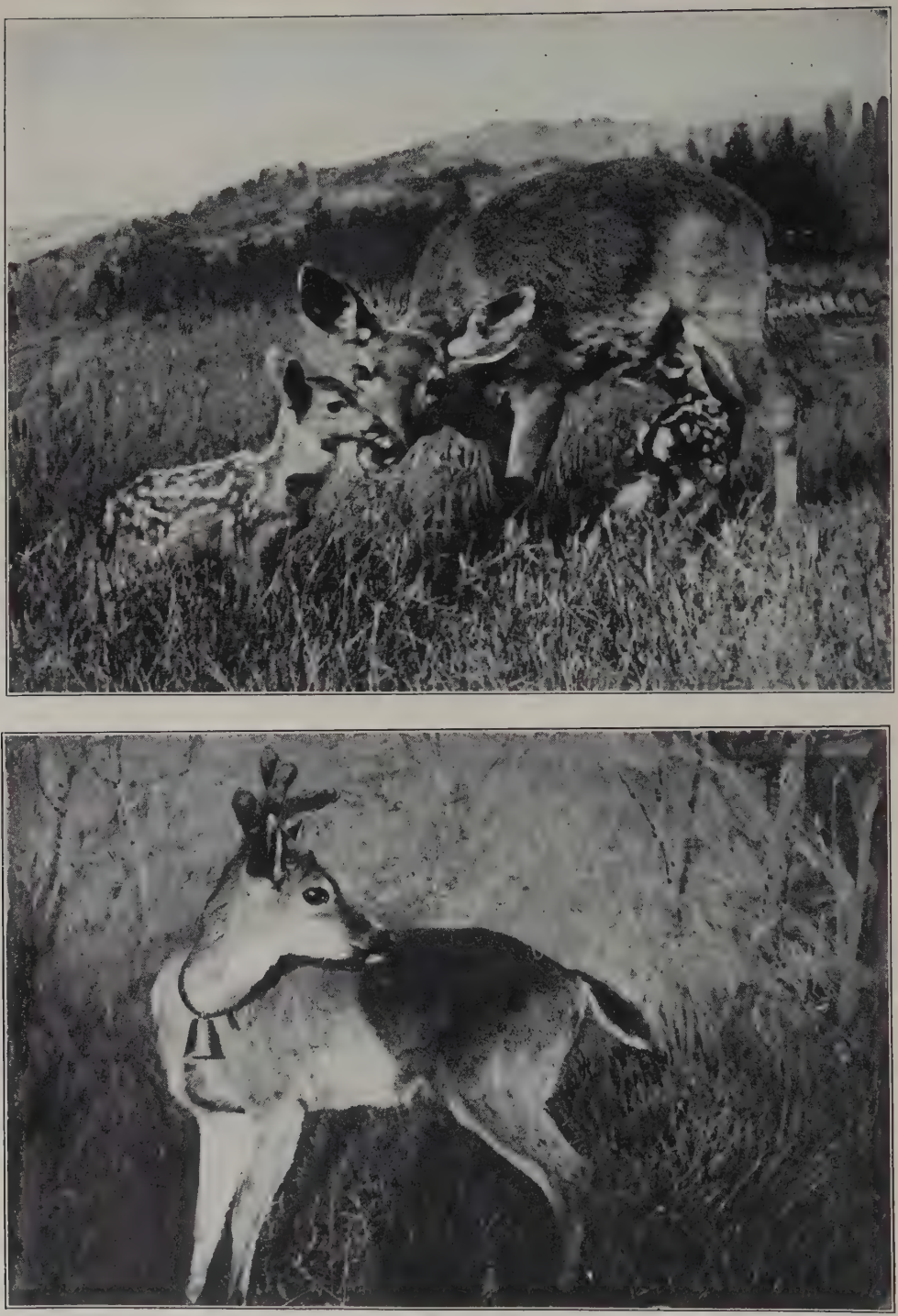

PLATE LX.—BLACKTAIL FAMILY GROUP

(Upper figure) Blacktail mother with her two fawns. (Lower figure) Young buck Blacktail
From photographs by Maude G. Prather of Montague, Calif.
Courtesy of *American Forests and Forest Life*

the once-over in order to plan his campaign of escape. In such a case, a Deer is liable to double or to run back through the drivers. I once saw a large buck suddenly appear like an apparition at the head of a drive. Then, with extraordinary skill, he simply effaced himself. He sank craftily in the bushes, and I didn't see them move again. Later, when we picked up his track, we found that he had turned tail and slunk out between the oncoming hounds and the drivers. Count on a Deer to do a thing as daring and as intelligent as that if he considers that he has to do it.

"The habit of the Whitetail to skulk has been his salvation. He is the greatest dodger, considering his size, of all animals. In this respect, he is remarkably like the Cottontail; and the behaviour of these two wild creatures may well be compared. A Rabbit makes a mighty show of speed when started, but he doesn't go far ere he resorts to other tactics. So does a Deer. A Rabbit will finally come back near the place where he was jumped. A Deer will likely do the same thing. Both are lovers of narrow ranges. Indeed, I consider them remarkably alike, even in their feeding."[157]

Other Tricks

Other hunters have offered testimony of similar import. One old woodsman told me that he had commonly known a famous buck, when pursued by the hounds, to make for a certain impenetrable thicket, land in its midst with one flying leap, then lie down. The thicket was some 20 yards across and impossible to the Dogs; this the Deer seemed to know and turned to account.

"Every hunter almost," says Hamilton Wright, "has at one time or another had the rare good fortune to play hide-and-seek with a Red-deer. In the winter time, telltale tracks in the snow reveal cunning detours, and how the unsuccessful still-hunter has gone home with an empty bag, while the Whitetail watched him from some dense thicket."[158]

Dunham Wheeler tells me that, according to his guides, it is quite a common thing for old bucks to run across and get behind the hounds; then to follow them at a safe distance.

Curiosity

An amusing evidence of buck curiosity, or perhaps sportiness, is furnished me by B. A. Eastman, of Barre, Vermont. "I was hunting with a friend in pursuit of Deer. I was acting the Dog, using a common dinner

[157]Wildwood Sport, p. 508.
[158]Sports Afield, Dec., 1900, p. 507.

horn and following a track, with my friend some 100 yards to one side walking parallel with me. The Deer left the big timber, and crossed a field and entered a swamp. Signalling my friend to come in, I explained that it would be better to take a stand farther down in the timber, and that I would allow him 20 minutes to get there before continuing my drive. I was standing in the open field. While waiting, the Deer became curious, not hearing my horn, and came back some 200 yards, and turned and again entered the swamp. I drove it for 30 minutes around a small thicket, with it at no time over 25 yards ahead of me. Finally it broke cover with long jumps, ran straight to my friend, and was killed."[159]

As Seen by a Woodman

"The best of all hunting," says Van Dyke, "is deer-hunting on soft snow two or three inches deep. Yet nothing is more apt to deceive the tyro, even when he has had much experience on bare ground. Of course, it is much easier to see the game against a background of white, especially if it is moving. But this gives the game precisely the same advantage over you; and strangely enough, you cannot overcome this by wearing white clothes. It took me several months to find this out, although I had been told so by some of the best hunters of fifty years ago. On very open ground, there may be some advantage, but in timber, the Deer seem to catch your motion against the background of tree trunks, which makes white clothing more conspicuous."

Addressing the beginner, he says: "Another error into which you are liable to fall, is keeping directly on the track. Deer that have been much still-hunted, soon learn to watch their back track before being alarmed, as well as after starting to run. To get an idea of how keen a Deer's eyes are to detect a motion, as compared with your eyes, it may be well to follow the track of some Deer that you have started. Follow the track for hours, or even all day, and the chances are very strong that you will never get a glimpse of him, although you will find dozens of places where he has stopped and [watched you]. . . .

"No other animal knows distance so well, and the great trouble is to reduce it enough to see him before he sees you; or to avoid his keen ears or nose long enough to get a shot at him, before he reaches the vanishing point. And many a hunter has travelled all day without getting out of sight of fresh tracks, yet failed to get sight of a Deer at any distance."[160]

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[159] Letter, April 3, 1924.

[160] Find Deer, pp. 206–07.

The Wise Whitetail

This is the only one of our Deer that can live contentedly and unsuspectedly in a hundred acres of thicket. It is the only one that can sit unconcernedly all day long while factory whistles and bells are sounding around it; and yet distinguish at once the sinister twig-snap that tells of some prowling foe, as far away, perhaps, as the other noises. It is the only one that, hearing a hostile footfall, will sneak around to wind the cause, study its trail, and then glide, cat-like, through the brush to a farther haven, without even trying to see the foe, who thus gets no chance for a shot. It is the least migratory, the least polygamous, the least roving, as well as the swiftest, keenest, shyest, wisest, most prolific, and most successful of our Deer.

It is the only one that has added to its range; that, in the North and West, has actually accompanied the settler into the woods; that has followed afar into newly opened parts of New England and Canada; that has fitted its map to man's; and that can hold its own on the frontier.

I shall always remember a scene at a mining-camp in Gilpin County, Colo., some years ago. The Whitetailed Deer was known to have come into the region within a few years, and the Mule-deer was growing scarce. A man came in and said, as he stamped off the snow: "I just scared up a couple of Deer on the ridge."

An old hunter there became interested at once; he was minded to go, and reached for his gun. But stopping, he said: "Whitetail or Mule?"

"Whitetail," was the reply.

"That settles it. A Mule-deer I could get, but a scared Whitetail knows too much for me."

He sat down again, and resumed his pipe.

Strange Instances and Explcits

"A Strange Foster-mother." On the cover of *Forest & Stream* for Jan. 15, 1910, is a beautiful photograph with the above title. It shows a spaniel wet-nursing a Whitetail fawn.

Deer Catching. The following adventure related by George M. Martin, my Mattawa guide in 1905, illustrates an exploit that has more than once been performed successfully. He was acting as guide near St. Regis Lake for a Mr. Kidder of New York. They saw a small Deer on an island (Stokes Island). It took to the water, and Kidder said: "I'd give ten dollars to have that alive." Martin, thinking it was a fawn of the year, said: "I'll catch him for you."

They paddled after it, and kept alongside till near the shore. As soon as the Deer touched bottom, in about 3½ feet of water, Martin jumped on its back, holding it with both arms round its belly. It plunged ashore, where he held on till its frantic kicking ceased. But it proved a small yearling buck, and much harder to hold than he expected. His shirt was torn to ribbons, and he was much scratched before it ceased kicking. Kidder threw him a shawl strap with which he tied all four feet together; but it gave one plunge and broke loose, then dashed into the water again.

The men followed in the canoe; it returned to the island, where Martin caught it as before. After another struggle, he got the shawl strap on its feet, but it slipped that off at first plunge. Martin now used his silk cravat as a tie, and the Deer was helpless. They took it in the canoe to the nearest station, where it was safely shipped to Kidder's park.

Lived with Bullet in Heart. John B. Burnham writes: "Ransom Palmer killed a Deer near Long Lake, that had carried a bullet in its heart for a considerable period. The wound had healed perfectly, and the Deer was fat and in fine condition. Doctor Wallace, of Philadelphia, has the heart preserved in alcohol, with the bullet, just as it was found."[161]

A Deafened Doe. H. T. Gray and his guide, Tom Todd, were hunting on the St. Regis, N. Y. They were lying in wait on a route of travel, when the guide whispered: "Keep quiet! There's a Deer coming out of the woods."

"Turning my eyes in that direction," says Gray, "I saw a young doe step from the shelter of the wood and begin feeding in a little hollow. I fired, and was amazed to see the Deer violently shake her ear and continue feeding. Then quickly followed 5 or 6 shots as fast as my repeating Winchester could send them.

"The Deer quietly fed on, undisturbed by the fusillade. I had but one cartridge left in the magazine, and was desperate. Was it a spirit Deer on which I was wasting my shots? Why could I neither hit her, nor drive her back to cover? I arose to my feet, took steady aim, fired my last charge, and the doe fell dead.

"Tom immediately went over to where she lay, and brought her to my stand. When we examined her, we found that the first shot had cut her ear. I could only infer that at the same time, I must have deafened her. That would explain her indifference to my continued firing. My last shot had pierced her heart."[162]

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[161] Forest & Stream, March 25, 1899, p. 224.

[162] Recreation, Oct., 1900, p. 252.

His Fatal Beauty—His Horns

Archibald Rutledge relates the following modern instance of Æsop's Fable of "The Stag and His Horns." The hunter had wounded a big buck which took to the water, pursued by the hounds. Then "it seems that as the wounded buck had taken the tide, he had had to swim under a few bushes; and down among these, a huge grapevine was draped in long folds. It was suspended from a giant cypress that stood on the bank. In his haste and distraction, the buck let a loop of the vine catch his horns fairly about the brows.

"Behind him on the bank were the hounds, informing him that they had come to call. Every time the buck would swim out a certain distance, the tightened vine would draw him back; then again his manœuvre would be repeated. It was a wild and a pathetic sight.

"Of course, we quickly put the fine old creature out of his struggles. The horns of that stag are now in my collection; and the savage rubbing of the grapevine on the beading just below the brow-tines is plainly discernible. To us, he has always been known as 'the grapevine buck.'"[163]

Erratic Behaviour

The following instance illustrates the futility of hard rules in considering the behaviour of creatures endowed with free-will.

The well-known sportsman, "Julian," says: "Some years ago, I was spending a few days in the early fall at a lumber camp. One morning I discovered a big buck swimming down the lake near the camp. So I walked along the shore, in plain sight of the Deer all the while, for nearly a mile; and when the Deer came out of the water, I was not to exceed four rods from him, standing in plain sight, and made no attempt to conceal myself. The buck looked at me a few moments, shook himself, and leisurely trotted away.

"I have often wondered if they had an idea when the close season was. Deer sometimes seem to be very stupid and dull, and will act in a manner hard to explain; but usually it will require all the shrewdness of a good hunter to get well within gunshot of a Deer.[164]

Again Rutledge says: "It often happens that a Deer, when shot at, will stop; but he will not stop thus if he is hit. I knew a Deer to come out to a green 'stander,' and actually to pose on a little hillock in front of him. At the first barrel, the Deer simply wheeled around, presenting the other

[163]Wildwood Sport, p. 485.

[164]Old Hunters, p. 535.

broadside. Of course, I am not saying that all Deer are so considerate of the amateur hunter."[165]

Value to Man

All game has four values: (1) the economic; that is, the dollars and cents value—quite the least. (2) The sportsman value. This is the one most readily cashed—the one that can always raise money, though it declares only one dividend each year. (3) The æsthetic value; that is, the pleasure it gives to all who see—both sexes, all ages, and all year round. (4) There is, however, a national value which will be considered last.

The dollar value is the one which carries quickest, deepest conviction to our legislators. In 1924, the State of Pennsylvania spent $608,168.04 on her Game and Game Refuge systems. She gave hunting privileges and pleasure to 600,000 hunters; and had, at the end of the season, a balance of $273,426.04 in the treasury to the credit of the Game account.

As a domestic animal, the Whitetail has another value. With the Deer adding 30 per cent. to their numbers each year, with buckskin worth $5 a pound, and meat 50 cents a pound, each average buck is easily worth $50; and can be raised for $20.

These things are fully set forth in the Biological Survey Pamphlet on "Deer Farming in the United States." (See References.)

There is, however, a totally different department in which the Whitetail can score. I mean as

A School for Manhood

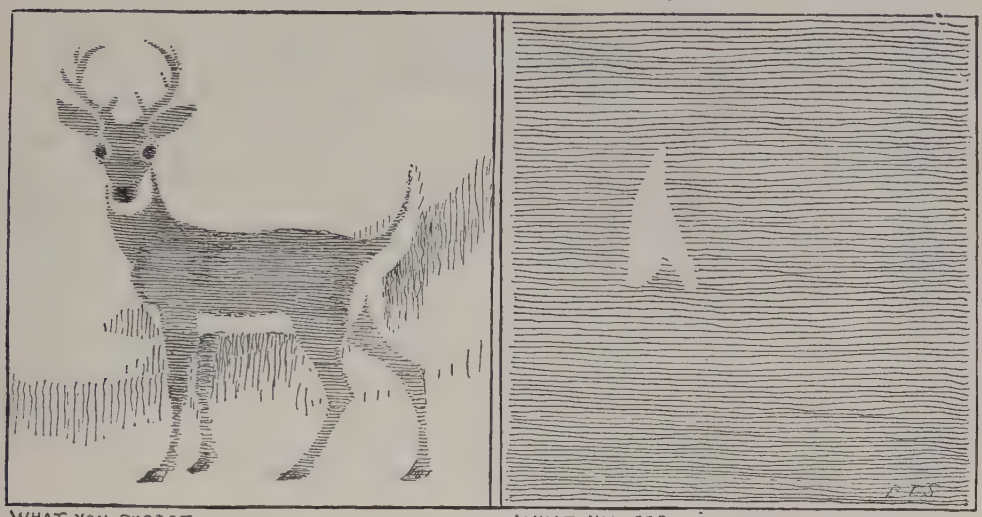
The Whitetail is the American Deer of the past, and the American Deer of the future. I have no doubt that, whatever other species drop out of the hard fight, the Whitetail will flourish in all the region of the plough, as long as there are sentiments and laws to give it a time of respite each year during its breeding season.

In some ways, it is no better than others of our horned game; but its habits fit it, in an unusual degree, to continue in all parts of the country.

As a domestic animal, it has not yet proven a success; but it may have another mission. The hunter makes the highest type of soldier, and the Whitetail makes the highest type of hunter that is widely possible to-day. The Whitetail trained the armies of the Revolution—even as the Antelope of the Veldt trained the Boers—and may supply the vital training of the country's armies in the future. When this people no longer has need of

[165] Wildwood Sport, p. 484.

armies, when the nations learn war no more, and men cease to take pleasure in beautiful wild life—then only can we afford to lose the Whitetail Deer.



WHAT YOU EXPECT WHAT YOU SEE

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LIFE L—ARIZONA WHITETAIL

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The Dwarf Deer, Arizona Whitetail, Coues' Deer, Desert Whitetail, Sonoran Deer, Gazelle Deer, Flagtail, Fantail, Cactus Fantail, Small Mountain Deer, Cheneche, Apache Deer

Odocoileus couesi (Coues & Yarrow)

(*couesi*, in honour of Dr. Elliott Coues, given by his colleague, Dr. H. C. Yarrow)

Cariacus virginianus var. *couesi*, Coues & Yarrow, 1875, Wheeler Survey, West of 100th Meridian, V. p. 72.

Odocoileus couesi Thompson Seton. 1898, *Forest & Stream*, Oct. 8, p. 286.

Type Locality—Camp Crittenden, Pima Co., Ariz.

Mexican, *Ciervo* (Deer in Spanish) (E. W. Nelson).

When seen at a distance, this elegant dwarf looks like a pale, dusty gray Virginian Deer with long tail and very small antlers.

Size. Total length, ♂ described by Dr. E. A. Mearns, 4 ft. 11½ in. (1,510 mm.); tail, 9½ in. (240 mm.); hind foot, 16⅜ in. (415 mm.).

♀ Length, 4 ft. 8⅜ in. (1,430 mm.); tail, 9 in. (230 mm.); hind foot, 15 in. (380 mm.).[1]

Weight. "The largest of 3 does shot by myself, did not exceed 60, and the smallest adult doe . . . would hardly reach 40 pounds. . . . Neither of 2 fat, 4-pronged bucks that I killed exceeded 70 pounds in weight."[2]

"Major Charles E. Bendire . . . informed me that the weight of old bucks ranged from 60 to 100 pounds. This accords with my observation. Two females (Nos. 20349 and 20350, U. S. N. M.,) (one of them immature, but fat), weighed 50 pounds each when eviscerated. Another female (No. 20576, U. S. N. M.), weighed 60 pounds gross. Fat old bucks were estimated at 80 pounds, gross weight; but none were weighed."[3]

Colour. "The prevailing colouration of this animal, taken in September, which is still 'summer' in Arizona, is a pale, dull fawn colour, with a peculiar ochreous shade, brightening into clearer tawny or reddish brown all around where the colour of the upper parts joins the white of the under por-

[1] Mamm. Mex. Bd., p. 184.

[2] Rothrock, Mamm. Wheeler Survey, p. 76.

[3] Mearns, Mamm. Mex. Bd., p. 178.

tions; and on the dorsal area becoming insensibly darkened in tone by an intimate admixture of mouse-gray. On this darkened area, the colour is a blended grizzle of the mouse-gray with pale fawn or nearly colourless ends of the hairs.

"The tail is rich reddish-brown on the central field above, fringed and tipped with white, and pure white below. Some of the terminal reddish hairs have a slight blackish tipping, but the sum of this scarcely produces a noticeable effect.

"The fore limb inside is white throughout, and whitish all around the digits; the hind limb is perfectly white inside only above the heel, and whitish all around the digits; both sides of the metatarsus being coloured.

"The ears are dark mouse-gray outside, bleaching at the edges; the hairs inside are pure white. The forehead is extensively dusky; the naked muffle and the abundant eyelashes are jet black."[4]

There is no black on ears or on tail.

The sexes are alike.

Range

"This small and exquisitely graceful Deer occupies the southwest corner of New Mexico, and southern Arizona; but does not range far to the northward. Three mounted specimens of this Deer in the U. S. National Museum were taken by Mr. E. W. Nelson at Blue River, Graham Co., Ariz., Nov. 13 and 14, 1890. I never saw it in northern New Mexico or Arizona, and even in the higher portions of the Gila Basin, it is rare or absent."[5]

Bailey says it "probably reaches its eastern limit in the Chisos Mountains of western Texas."[6]

Nelson, who followed it far to the southward, says that it is common "in the Sierra Madre of Chihuahua and Sonora, Mexico."[7]

Haunts

In southwestern Texas, according to Bailey, "these little Deer range from 5,000 feet at the upper edge of Lower Sonoran zone through Upper Sonoran and Transition to the top of the mountains at 9,000 feet. They are closely associated with the oaks, junipers, and nut pines, and depend much on the cover of brush and timber. During the day, they are usually found lying under a low, branching juniper tree or in a thicket

[4]Coues & Yarrow, Wheeler Survey, pp. 73–74.
[5]Mearns, Mamm. Mex. Bd., p. 181.
[6]Texas, p. 64.
[7]W. A. N. A., p. 457.

of oak brush, and when started are more often heard bounding over the rocks than seen in the open. They are most numerous on the plateau top of the mountains, at 8,500 feet, where a steep 3,000-foot slope protects them from most hunters, and where the sweet acorns of the little gray oak are abundant. Between rains, the only water on this plateau is held in the rock basins, but it is usually ample for the needs of the Deer. A few springs around the base of the mountains are permanent and always accessible in case of drought."[8]

Nelson knew them the year round, and writes of their haunts: "During summer and early fall in the higher ranges, small bands of Arizona Whitetails occupy the lower parts of the yellow-pine forests, between 6,000 and 9,000 feet altitude, where they frequent thickets of small deciduous growth about the heads of canyons and gulches. As winter approaches, and heavy snowstorms begin, they descend to warm canyon slopes to pass the season among an abundant growth of pinyons, junipers, oaks, and a variety of brushwood."[9]

Dr. C. B. R. Kennerley gives us at once a picture of the creature's mind and of the remorseless hunter who pursues it. He says:

"During our stay at Los Nogales in the month of June, particularly the latter part, the heat during the day was quite oppressive, and the valleys of the streams with their thick undergrowth affording a good protection from the rays of the sun, were the favourite places of resort for these animals. Very early in the morning, they were found feeding on the hills, but retired under the shelter of the bushes about 10 o'clock, after which time they could be killed as easily as Rabbits, by the hunter passing through the undergrowth with a gun charged with buckshot."[10]

Numbers and Slaughter

Mearns cites the intrepid border pioneer whom he chooses to present under the colourless name of "Mr. Hall"[11] to the effect "that the Sonoran Deer sometimes congregate in herds during winter, when they descend from the mountains. He had seen hundreds of bucks assembled—a forest of horns. We saw no herds, but small groups were very numerous in some localities. In 1893, a hunting party from Fort Huachuca reported killing 36 Deer on a trip of a few days to Cajon Bonito Creek, Sonora. We found

[8]Texas, p. 64.

[9]W. A. N. A., p. 457.

[10]Baird, Mamm. Mex. Bd., 1859, p. 51.

[11]This was Guadalupe Hall, who was killed in 1893 by Gallego, in a dispute over range rights in Guadalupe Canyon.

this species abundant on both sides of the San Luis Mountains, where many were killed to furnish food for our party. Next to the Antelope, it furnished us with the greatest amount of venison. It was last found in abundance in the region about Paso de Luis, Sonora, where several were killed by members of our party. At this place, horns had been cast off in the greatest number."[12]

"In the White Mountains of Arizona," says Nelson, "between the years 1883 and 1890, when wild life was more abundant than at present, I often saw, on their wintering grounds, large herds of these graceful Deer, numbering from 20 to more than 100 individuals."

Capt. H. F. Kendall of the 8th Cavalry, U. S. A., writing of the "small Mountain Deer" that are found about Chisos Mountains, says that here "Deer were very scarce from the fact that a hide-hunter named Sparrow, from the town of Fort Davis, had spent the winter in and about the Chisos, and had, it was reported, sent out upward of 600 skins, leaving the carcasses to rot on the ground. That numbers had been so killed I know from the great number of remains I found in the country."[13]

Habits

If we can imagine a Cottontail Rabbit crossed with a Whitetail Deer, we shall have a fair idea of this elegant creature. In habits, it resembles both. A vivid snapshot is offered by Bailey as he writes: "On several occasions, by moonlight, the flash of their white tails at close quarters was seen with startling effect, the gray bodies being quite invisible."[14]

If, further, we recall the account given of the Whitetails' behaviour, then intensify and refine that a number of times, we shall have a fair presentation of the wonderful little Flagtail in its underbrush homeland.

Mearns, after many years among them, wrote: "The Sonoran Deer is the most beautiful species known to me. When surprised in thickets bordering the streams, it sometimes evinced more curiosity than fear."[15] And Nelson, telling of its rabbit-like ways in the underbrush, says: "In the Sierra Madre of Chihuahua one summer, I found these little Whitetails occupying 'forms' like Rabbits, located in the sheltering matted tops of fallen pine trees which had been overthrown by spring storms. In these shelters, they rested during the middle of the day, secure from the Wolves and Mountain Lions which prowled about the canyon slopes in search of prey."[16]

[12]Mamm. Mex. Bd., pp. 182–83.
[13]Forest & Stream, June 29, 1895, p. 527.
[14]Texas, p. 64.
[15]Mamm. Mex. Bd., p. 183.
[16]W. A. N. A., p. 457.

When the stealthy gunner chances on them in their dense retreat "they would rarely spring from their concealment until approached within 20 paces. So says Kennerley[17]; and to this, we add: "How easy the next move of the game-hog with the buckshot charge, as these innocents stare big-eyed, and big-eared, too guileless to fly for safety!"

In pristine happier days, when man was not a creature more destructive than several other natural foes, the Whitetails of the East fed much by day. It was eternal, ruthless persecution that made them furtive "birds o' night." In the Fantail, we have yet a picture of these bygone days, for Bailey says of those he saw on the uplands of western Texas:

"The Deer on the plateau are so little disturbed that they are often seen feeding or wandering about during the day. While sweeping the slopes with a field glass, I often located Deer and watched them without arousing their suspicion. At 11 o'clock one warm day, I watched 3 does come down from an open sunny hillside, and select cool beds in the shade of bushes along a deep gulch. At another time, I watched a doe and 2 yearling fawns feed until they were satisfied, and then scatter to make their beds under different trees on an open grassy slope."[18]

Telling of the great bands that he saw in the White Mountains in 1883, Nelson says:

"Such gatherings presented the most interesting and exciting sight, whether the animals were feeding in unconscious security, or streaming in full flight along the numberless little trails that lined the steep slopes. Where these Deer live on the more barren and brush-grown tops of some of the desert mountains in southwestern Arizona and Sonora, the snowfall is so light that their summer and winter range is practically the same.

"Although far more gregarious than our other Whitetails, the herds of Arizona Deer break up in early spring."[19]

Drink and Food

But theirs is a land of drought. Water is scarcer than food, and a harder search. As Mearns writes:

"This Deer usually goes to water about midday, and often spends the hottest part of the day in the shade of willows and cottonwoods that fringe the streams."[20]

This daily drink seems essential, and yet the map shows the Whitetail

[17]Baird, Mamm. Mex. Bd., p. 51.
[18]Texas, p. 64.
[19]W. A. N. A., p. 457.
[20]Mamm. Mex. Bd., p. 83.

of the far Southwest to be a dweller in arid country where no water is. Here, like the Antelope, the Desert Sheep, the Kangaroo-rats, and others, they find their water supply in the leaves and shoots of desert shrubs. Chiefest among these is the provident cactus, which is, among plants, what the Camel is among beasts—a living tank—able to store up, in times of rain, enough water for the thirsty days to come.

"The food of the Deer," says Bailey, "in June consisted mainly of leaves, flowers, green seeds, and capsules or pods of a great variety of shrubs and plants, including the leaves of the little gray oak (*Quercus grisea*), leaves and wide flat pods of several bean bushes (*Acacia roemeriana* and others), leaves and berries of sumac (*Schmaltzia microphylla*), leaves and capsules of a large *Pentstemon*, and flowers and stems of bear-grass (*Nolina lindheimeriana*). The prints of the Deer's teeth were often found on the half-eaten green stalks of the century plant (*Agave wislizeni*).

"Much-used trails and abundance of winter sign among the oak showed that acorns were the great attraction during fall and winter. No trace of grass could be found in any of the three stomachs examined."[21]

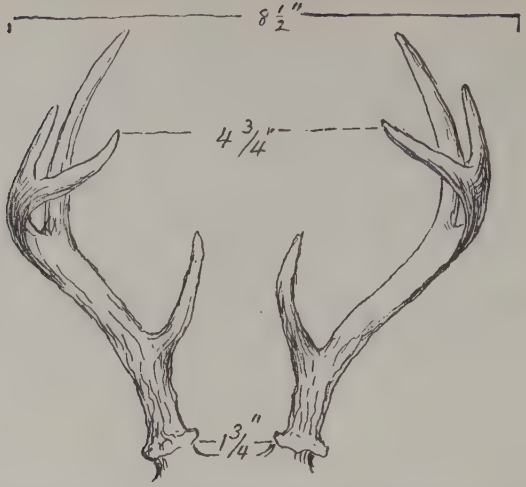
The Teeming Time

"At this season, June," says Kennerley, "the horns of the bucks were but a few inches in length, and the females generally far advanced in pregnancy. We observed often the young of the previous year still following the doe which was about to bring forth another progeny."[22]

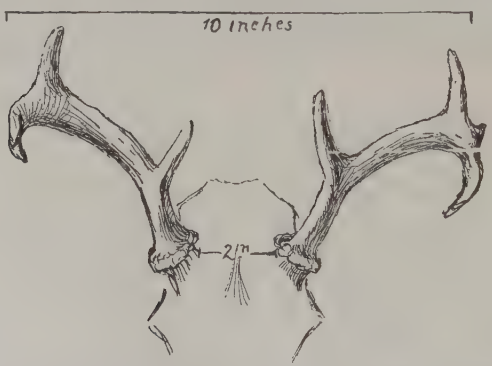
"During the breeding season," says Mearns, "many of the does ascend the higher mountains in company with their progeny of the preceding year. The young, sometimes one, but usually two, are born during July. A female killed at Monument No. 65, on the San Luis Mountains, June 2, 1892, contained one fetus the size of a Jackrabbit, and was accompanied by her two young of the last season, one of which also contained a fetus; one shot June 19 on the east side of the same range contained 2 fetuses; one taken at Cloverdale, New Mexico, July 15, 1892, contained two young (both male) ready for birth, and a fourth, shot beside Cajon Bonito Creek, Sonora, July 24, 1892, contained two fully grown spotted fawns."[23]

Continuing the woodland tale, Nelson remarks: "At this time, one or two fawns are born, amid early flowers in the charming vistas of the open forest. Very young fawns are hidden in rank vegetation and sometimes

[21]Texas, pp. 64–65.
[22]Baird, Mamm. Mex. Bd., p. 51.
[23]Mamm. Mex. Bd., p. 183.



Northern Fantail (?) collected by Vernon Bailey, Bear Lodge Mts., Wyo., Aug. 30, 1913.
No. 202513 U. S. Nat. Mus. Length, rt. 10 inches; l. 11 inches



Fantail Antlers found by Robert Ansley on Inyan Kara Mt., Blackhills, Wyo., 1890.
Each is 8 inches long, 8½ inches tip to tip, girth at base 2 inches.
See *Forest & Stream*, Aug. 3, 1895

Tracks of Fantail, drawn from life by R. C. Fisk, Nov., 1901

PLATE XLVIII.—DETAILS OF FANTAIL

left temporarily by their mothers. If a horseman chances by, the fawns may rise and follow innocently at the Horse's heels. On such occasions, I have had difficulty in driving them back to prevent their becoming lost."[24]

And Mearns, keen naturalist of the sort that measure teeth, and yet love kindly motive and appreciate romance, adds this:

"On Sept. 11, 1893, I reached the summit of the highest peak of the San Luis range, and was resting in a thicket close to the summit, when a sound caused me to bring up my rifle ready for use. I half expected to see an Apache of the Kid's band, but instead a beautiful doe appeared, followed by a couple of spotted fawns, that immediately began to nurse. I was unseen, and the wind carried my scent from them, but the mother tarried but a moment, and then disappeared over the ridge, where I heard the patting of her hoofs, and the sound of sliding stones as she bounded away, closely followed by her nimble progeny."[25]

As I read again this bald, unlovely setting forth of the life and way of the loveliest of the whole Deer tribe, this woodland fairy of romantic dells, I am shamed for its worse than vapid flatness. There is no suggestion here of the exquisite grace and beauty of the creature itself—nothing of the picture in its every pose—the poem in its every hour of life. I can only hope that some young naturalist in the far west Sunland will see this bloom, this essence and quintessence of the whole Deer tribe, and tell the world how good it is to see. For me, the chief excuse for failure is this: I never once was privileged to see the fay myself.

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1918—Wild Animals of North America, by E. W. Nelson.

[24]W. A. N. A., p. 457.

[25]Mamm. Mex. Bd., p. 183.

LIFE LI—NORTHERN FANTAIL

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The Northern Fantail, Gazelle Deer, Willow Deer, or Towhead

We come now to the endless puzzle of the Northern Fantail or Gazelle Deer.

The Old-timers' Symposium

So much had been said about it by old-timers, and so little accepted by scientists, that in *Forest & Stream* for Aug. 3, 1895, Emerson Hough offered a symposium on the Fantail Deer or Dwarf Whitetail. "El Comancho" (W. S. Phillips of Seattle, Wash.), whom he quotes, says the Dwarf is about half the size of a buck Antelope. It was common in the Black Hills. It frequented dense thickets, and never associated with the big Whitetail. It behaved more like a Cottontail Rabbit than a common Deer. It is now extinct. He produces a pair of horns from the Black Hills. These are figured with the article in question. They are exact miniatures of Whitetail horns. From burr to tip they are 8 inches long, and 2 inches apart on the skull. I reproduce the illustration.

Since then, another detailed account has been offered by a responsible observer, Lieut. John H. Gardner, who wrote from Fort Washakie, Wyo., to *Recreation* (Oct., 1898, p. 305). He says:

"About ten years ago, while scouting in the Big Horn Mountains of Wyoming, I came across what appeared to be the bleached skeleton of a Whitetail Deer; but was so struck by its diminutive size, that I kicked the head off and brought it into camp. I later mounted the horns and have since kept them as a curiosity.

"When I found it, I supposed it was but a dwarf, and only valuable as a freak. I afterward showed the horns to a number of Sioux, Crow, and Cheyenne Indians, who all said their fathers had told them there was in their time a race of Dwarf Deer inhabiting the Big Horn Mountains; but that none of the present generation had ever seen any of them. I heard the same story, also, from a number of white men who had spent most of their lives in that section.

"The horns show 5 points, are 2 inches apart at the base, $4\frac{1}{2}$ between tips, and 6 inches in height. The greatest distance between any two corresponding points is 8 inches.

"There was, unfortunately, no way of saving the skeleton, which was perfect and apparently about the size of a half-grown Sheep; but it is possi-

ble some of your many readers may be able to decide whether this animal was one of the race or only a freak."

The number of old-timers who tell of the Fantail Dwarf is legion. Orin Belknap, Bill Hamilton, El Comancho, J. J. Fulton, M. P. Dunham, Dr. Geo. B. Grinnell, and others not so well known, went on record in *Forest & Stream* or *Recreation* during the period of 1895 to 1900, as having seen this tiny and elegant creature.

Recent Testimony

As samples of unpublished testimony, I give the following:

Dr. George B. Grinnell writes me (May 6, 1926): "In 1874, when with Custer's expedition to the Black Hills, L. H. North and I killed in the Black Hills three or four extraordinarily small Deer. They were so small that one man could readily pick one up and put it behind the saddle on his Horse. Of those we killed, none were bucks.

"In later years, after my attention was called to the Fantail, I saw on two or three occasions mounted heads of extraordinary small buck Deer, which I thought were probably Fantails. One of these was in a gun store in St. Paul, and another was in a gun store or in a hotel, I think, in Billings, Mont. These heads were exactly like those of an ordinary Deer, except that they were tiny."

Dr. James R. Walker of Pine Ridge, S. D., and several men about the town, testified (July, 1902) that there was or had been a small Deer in the thickets of this region. It weighed 80 or 90 pounds, had very small, but perfectly formed horns, and was known as "Fantail," but had not recently been taken.

My Bitterroot guide, Abe Leeds, tells me (Sept. 4, 1902) that in all the low thickets of the Upper Clearwater is a small species of Whitetail, 60 or 70 pounds in weight, with small, much incurved horns. It lives in the willow and alder thickets. Its habits are more like those of a Rabbit than of a Deer. It is the hardest of Deer to hunt and stalk. It is rare, but a few are still to be found.

Ed. Carter, the naturalist of Breckenridge, Colo., told me personally (Oct. 30, 1899) that in old times, the Flagtail was found in these mountains. "In the winter of 1861 especially," he said, "I saw many in the foothills between St. Vrains and the Big Thompson, and shot an adult buck. I am certain that it did not weigh 100 pounds, probably not 75. The boys chaffed me about bringing in a Jackrabbit. I am inclined to think it is a species that has become extinct; as no one ever gets one now."

R. Clarke Fisk of the P. O. Helena, Mont., wrote me that he knew them well; a few are still to be found along Smith River, 90 miles from Helena. "Their beds are tiny things, not much bigger than those of a good-sized Jackrabbit. Several that I measured were between 13 and 14 inches long and about 8 inches wide." A Helena friend of his has a set of the horns. He also sent me drawings of its tracks, made from life.

Bradley, the taxidermist whom I saw at Helena (May 23, 1901), confirmed Fisk's story, and added that the Gazelle was very local in distribution. Once it was common, but now is nearly exterminated.

O. A. Robertson, an old-timer living at Milligan, Mont., writes me (Aug. 7, 1901) that he knew Gazelle Deer well. They are like the big Fantails, but "they are small, weighing from 30 to 40 pounds." "There are about 6 or 8 of them left here within 3 miles of our place, and there are some 15 on Sheep Creek near White Sulphur Springs. . . . When they are running, they hold the tail down with the lower end crooked up a little, and they jump zigzag, so they are very hard to hit."

James Fullerton writes me (Dec. 4, 1898) from Meeker, Colo., offering many corroborative details.

One of the latest published accounts is by J. J. Fulton of Soda Springs, Nev. It is very full on the Fantail, after referring to their existence in California and southern Oregon. He succeeded in getting one on Goose Creek, near the north line of Wyoming. "The smallest 5-point buck I ever saw." On Little Wolf Mountain, in 1880, he "found many of the horns all very small and crumply," but has never since met the Deer.[1]

Is He a Myth?

All this testimony makes a strong verbal showing, yet it must be remembered that not one of the witnesses has come forward with a complete specimen, or even a perfect skull. At best, in the U. S. National Museum, we have one or two pairs of horns, and fragmentary skulls. These are, at present, ascribed to the big Whitetail. But they are notably small, and may yet justify the naming of a new species.

If I accept all this as evidence, and fairly balance the same, it shows that at one time there was a Dwarf Whitetail found in the thickly wooded ravines of the Eastern foothills of the Rockies; that it reached the Black Hills, the Bighorn Mountains, and the Little Wolf Mountains of Montana. It was, to all appearances, identical with the Dwarf Whitetail of Arizona—was probably a northern race of the same. Or else—*the whole thing is a myth.*

Dr. E. W. Nelson inclines to the latter explanation.

[1]Forest & Stream, Nov. 20, 1909, p. 816.

LIFE LII—THE MULE-DEER

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Mule-deer, Mule Blacktail, Hill Blacktail, Hill Deer, Rocky Mountain Blacktail, Bounding Blacktail, Burro-deer, (i. e., Donkey-deer), Bounding Deer, or Jumping-deer

Odocoileus hemionus (Rafinesque)

(Gr. *Odocoileus*, see ante; Gr. *hemionos*, a half-ass or mule)

Cervus hemionus Rafinesque, 1817, Am. Monthly Mag., I, Oct., p. 436.
Odocoileus hemionus Merriam, 1898, Proc. Biol. Soc. Wash., XII, p. 100

Type Locality—Mouth of Sioux River, So. Dak.

French Canadian, *le Daim fauve à queue noire; le Cerf mulet.*
Cree, *Ap-is-chich-i-koosh* or *Ah-pe-tchi-mu-siš* (small Moose).
Wood Cree and Sauteaux, *Muk-i-ti-wah-no-wish* (black tail).
Yankton Sioux, *Tah-chah* (Deer).
Ogallala Sioux, *Tah-heenchála* (Deer).

When seen alive, the Mule-deer strikes one as a large Deer with immense ears, and a white face which bears a large black patch on the forehead. From behind, the creature shows an angular whitish patch taking in the tail, which is small and mainly white with a black tip.

To the generic characters, it adds the following:

Size. Length, about $5\frac{1}{2}$ ft. (1,673 mm.); tail, 7 in. (177 mm.); hind foot, $19\frac{1}{2}$ in. (495 mm.); length of ear, about 10 in. (254 mm.); metatarsal gland, about 5 in. long (127 mm.).

The ♀s are smaller.

Weight. A typical buck killed in Colorado, Oct. 1, 1901, weighed $215\frac{3}{4}$ lbs. The largest of 5 that I weighed was $243\frac{1}{2}$ lbs. live weight; but I was told that specimens of 300 lbs. weight were often taken. A doe killed in the Upper Wind River, Wyo., weighed, after bleeding, $137\frac{1}{2}$ lbs.

F. P. Cady gives "Careful weights taken on steelyards, showed 217 lbs. and 220 lbs., after the entrails and feet had been removed."[1] That is, their live weights were 260 lbs., and 264 lbs. Evidently these were representative of Washoe Co., Nev.

The heaviest weights that have authoritative backing are given by

[1]Cal. F. & G., Oct., 1919, p. 205.

J. S. Hunter of the California Fish & Game Commission, as follows: "Dr. Tinsman of Adin will vouch for one that dressed 380 pounds. I have a picture of the head of a Mule-deer that dressed 350 pounds."[2] These figures would represent a live weight of 456 lbs. and 420 lbs. respectively.

Colour. Winter or blue coat. The above Colorado buck was in general of a warm brownish gray, thickly peppered with black tips and rings on the individual hairs. The inside of legs, the belly, and patch on buttocks are white. The face and throat are dull white with a large black patch on the forehead and a black bar around the chin. The tail is white, except the bunch on the tip, which is black all around. The legs below the knees and hocks are clear sienna brown. This represents the blue coat; a month earlier it would have been much darker and slatier. Compared with the Whitetail of the same date, it is of a colder gray.

Many specimens have the lower throat and chest with a smudge of blackish brown or umber.

Summer or red coat. The red coat appears in May, and is worn till late August; it is rusty yellow rather than red. The head, tail, and legs change little with the season.

The ♀ is similar to the ♂, but duller. The fawn is dull yellowish, thickly spotted with white, as in the rest of the family.

Change of coat. The change from the very red coat to the very blue is made in Colorado about the end of August. The vigorous individuals are the first to turn blue, the sickly last. As the change is somewhat abrupt, and irregular, it results in some very singular effects and surprises. On Sept. 3d, I saw a Deer in red coat except the head, which was in blue. On Sept. 4th, I startled a fawn out of a thicket. As he passed into the open, I saw that he was in bright red coat; but he took alarm, retreated into the thicket, and when he came out on the other side, he was in bright blue. This was neither an optic illusion nor a lightning change. I found that he was all blue on the left side, and all red on the other. Possibly this was a left-handed fawn that always lay on the left side, and so had completely worn the coat off there, before it was broken on the right.

Races

Eight races of the species are recognized:

hemionus Rafinesque, the typical form of the Plains and Badlands. T. l., Sioux River, So. Dak.

macrotis Say, the small-toothed Rocky Mt. form. T. l., Major Long's Creek, N. M.

[2]Cal. F. & G., Jan., 1924, p. 19.

virgultus Hallock, much like *hemionus*, but with jet-black breast and entire belly and antlers much smaller. T. l., Hallock, Minn.

californicus Caton, with a dark stripe from the back along upper surface of tail. T. l., near Gaviota Pass, 40 miles from Santa Barbara, Calif.

peninsulæ Lyddeker, very small and brightly coloured. T. l., Sierra Laguna, Lower Calif.

eremicus Mearns, very pale. T. l., Sierra Seri, Sonora, Mex.

canus Merriam, very small, pale, and gray. T. l., Sierra en Media, Chihuahua, Mex.

cerrosensis Merriam, like *californicus*, but smaller, and with dwarfed antlers. T. l., Cerros Id., off Lower Calif.

From the Coast Blacktail (*O. columbianus*) the Mule-deer may be distinguished at once by the tail, which in *columbianus* is bushy and tapering from the base; and all above black, all below white; and by the metatarsal gland, which is about 3 in. long on the Coast and about 5 in. on the Mule-deer. In neither of these is the gland edged with white as in *virginianus*.

Similarly, from the Virginian Deer or Whitetail it may be distinguished by the style of tail (which see) and the metatarsal gland, which in the Whitetail is about 1 in. long (see Plate).

Hybrids

According to Bryant, "several Deer have been killed on the Lassen within the past two or three years, that are apparently crosses, having the tail of the Columbia Blacktail with no patch of white around the base of the tail, but having all other appearances of the Mule-deer."[3]

In the *Journal of Mammalogy* for Aug., 1921 (pp. 140 to 143), is the description of certain hybrids between the Mule-deer and the Coast Blacktail. These are more fully noted in the Life of the latter.

Another interesting animal, probably a hybrid, was described by Mearns as a separate species as follows:

Crook's Deer, *Dorcelaphus crooki* Mearns, 1897, Proc. U. S. Nat. Mus., XX, p. 468, Dec. 24. Preliminary description, issued Feb. 11, 1897.

This curious creature shows a very complete combination of Mule-deer and Whitetail characters. It has the ears, forehead mark, and white buttocks of the Mule-deer; but the horns, tail, metatarsal gland, as well as the general size and form of the Coast Blacktail; which is another way of

[3]Cal. F. & G., July, 1920, p. 134.

saying that it is halfway in characters between the Mule-deer and the Arizona Whitetail, both of which are common in the region where this was found.

It is much paler in colour than the Blacktail of the Columbia, and smaller, but with larger ears. Only two specimens have been secured.

The type specimen, a ♀ killed June 9, 1892, is given by Mearns as follows: Length, 57 in. (1,440 mm.); tail $7\frac{3}{4}$ in. (195 mm.); hind foot, $15\frac{3}{4}$ in. (400 mm.); Weight, eviscerated and dry, 72 lbs.

Colour, "reddish fawn, darker from black annulations on the back, lightening to grayish cinnamon on the sides, and grayish drab on the neck. The legs are cream-buff, except where new clay-coloured hair is coming in on the interior border, the limbs being almost the last part to receive the summer coating. The colouring of the head is very similar to that of the Mule-deer in corresponding pelage." The tail is coloured much as in the Coast Blacktail, but has a longer switch; that is, it is like that of the Whitetail, but darker on top.

This Deer was first found by Gen. George Crook, Dec. 5, 1884, near the base of Bill Williams Mt., Ariz. He sent a specimen to the naturalist, Dr. E. A. Mearns, who, as already noted, described it in 1897 under the name of *crooki* in honour of the discoverer.

It is found, so far as recorded, only in "mountains of western New Mexico and eastern Arizona (Dog Mts. of New Mexico, to Bill Williams Mt., Ariz.). It belongs to the Transition Zone of the Elevated Central Tract."[4]

It is an upland and mountain species, frequenting thickets from 5,000 to 6,000 feet above the sea, in the zone of alligator juniper.

Mearns, from whom this information is drawn, adds this painfully short note. He "learned nothing of the habits beyond the fact that it is agile and shy,"[5] which illuminating remark applies equally well to each and every one of the game animals in this work.

History

Spaniard and Frenchman saw the Mule-deer long before any of the English race; but it was not described and named on paper till Lewis and Clark, in 1804, went on their famous journey. Sept. 17th of that year, when on the Missouri below Sioux River, they wrote: "Among our acquisitions to-day were a Mule-deer, etc. . . . Capt. Lewis and some men

[4]Mearns, Mamm. Mex. Bd., p. 185.

[5]As above, p. 191.

went out to hunt and killed . . . two Blacktailed Deer. . . . The Blacktailed or Mule-deer have much larger ears than the common Deer, and tail almost without hair except at the end where there is a bunch of black hair."[6] Two days later (Sept. 19th), they secured 4 specimens, "one a buck with two main prongs of horns on each side, and forked equally."

From this description, Rafinesque, in 1817, gave it its first scientific name—*hemionus*, or "the Mule."

The name "Jumping Deer," widely used in Manitoba, is derived from its wonderful gait.

Antlers

The antlers are very different from those of Whitetail; but resemble, somewhat, those of the Coast Deer. They are what scientists call "dichotomous"; that is, they are an arrangement of even forks, instead of having a main branch with snags. This, of course, is the type; the variations of it are endless, as suggested by the illustrations. Their history of growth is much the same as that of the Whitetail.

Rowland Ward's book[7] gives first place to a Wyoming head owned by J. G. Millais. Length, 34 in.; girth, 5 in.; tip to tip, 18 in.; widest inside, $21\frac{3}{4}$ in.; points 19+18.

Next is a British Columbian head owned by H. Whiting. Length, $32\frac{1}{8}$ in.; girth, 6 in.; tip to tip, $26\frac{3}{4}$ in.; widest inside, $44\frac{1}{8}$ in.; points, 25.

Third, is the Wyoming head owned by C. R. F. Lutwidge. Length, 32 in.; girth, 6 in.; tip to tip, 26 in.; widest inside, ? ; points, 21+19.

Fourth is the Wyoming head owned by Dr. H. M. Beck. Length, $30\frac{1}{2}$ in.; girth, $7\frac{3}{4}$ in.; tip to tip, ? ; widest outside. $39\frac{1}{2}$ in.; points, 61. (The last 3 are owners' measurements).

If we appraise them on the points claimed, adding an average number when details are wanting, we have the Beck head first with $156\frac{1}{4}$ points; the Whiting head second with 134; the Lutwidge with 125; and the Millais with $115\frac{3}{4}$. The important elements of massiveness and symmetry, however, do not appear in this.

In the Badminton Library of Sports, C. Phillipps-Wolley gives a cut of a 59-point head from British Columbia.

A number of freak or remarkable heads are figured in the Plates.

It is well known that the antlers are in close touch with the sexual organs, and that any change, injury, or effect in these organs, is at once reflected in the antlers.

A remarkable illustration came from Colorado some years ago. Edwin

[6]Lewis & Clark, Coues ed., 1893, I, p. 121.

[7]Records of Big Game, 1922 ed., p. 97.

PLATE XLIX.—MULE-DEER STUDIES, CARBERRY, 1886

Carter tells me that the cowboys of Routt and Rio Blanco counties got the idea that they could improve the quality of their venison by castrating a large number of bucks. In the spring round-up of 1891, or thereabouts, they castrated every Burro-deer fawn they could find, and there were many. The only known result was that, in the years that followed, some extraordinary freak antlers were seen among the Deer. The most curious one that I saw is illustrated in the Plate.

This subject is more fully discussed in the Life of the Coast Deer.

The Tail

The tail of a Deer should always be noticed by the sportsman. It is the surest easy external mark of identification for those not skilled in anatomy. That of the Mule-deer is shown in the Plate, with those of its near kin for comparison.

On May 5, 1901, in Mehesey's taxidermist store at Los Angeles, I saw a common Mule-deer, taken in Webber Co., Utah. The great length of its tail was its unusual feature. It was $13\frac{1}{2}$ in. long, with the black tuft of hair very small.

Though the coat in general is changed twice a year, the hair on the tail, as Caton points out,[8] is shed but once a year; and the black switch on the tail of the present species is never shed at all. Thus it has passed through many stages of a peculiar process. Most products of the skin are shed periodically—for example, the hairy coat of mammals, the outer skin of snakes, the feathers of birds—but some more highly specialized products, as the teeth of a snake, are shed at long intervals; those of still higher developments, as the rattle of a rattlesnake, the mane of a Horse, or the beard of a gobbler, are so "expensive" that nature has economized, ordaining that they never be shed at all. Of this class are also the horns of a Rhinoceros and the tuft on the Mule-deer's tail.

The movements of the tail are as characteristic and expressive as its form. In bounding away, the Whitetail holds its banner aloft and waves it from side to side. The Mule-deer carries its tail drooped, and swings its black tuft back and forth over the white disk. The Coast Blacktail carries its nearly level. All three species drop and quiver the tail when they are struck by the hunter's bullet.

Range

The range, as set forth on the map, shows a surprisingly large extent of country—many faunal areas, indeed—covered by the typical *hemionus*,

[8] Ant. & Deer, p. 242.

without the appearance of corresponding races. In Manitoba, it is becoming scarce; but on the Athabaska River, it seems to be spreading with agriculture. In ancient days, it seems not to have ranged below Athabaska Landing, whereas now it is well known at least as far as Fort McMurray.

The principal shrinkage in this range is that shown on the prairies and plains country of the Middle States. That is, the Mule-deer is gone from Kansas, Nebraska, nearly all of South Dakota, eastern Colorado, and Oklahoma, since 1900, or earlier.

Haunts

This is essentially a Deer of the lower hills or broken ground that is partly wooded. If we chart all the high mountains, the open plains, the dense continuous woods, and the swamps within the Mule-deer's range, and compare the result with a particular map of the animal's distribution, we shall find that the latter group are devoid of this species. It does, however, go above timber line in hot weather; and originally, it wandered on the Plains far from timber.

Home Range

In my many hunting-trips in the hills about Carberry, during the early '80's, I noticed that the Mule-deer was satisfied with a very small home ground, if let alone. I knew a band of three or four Deer that spent several weeks in a wood of less than 100 acres, on the north side of Mitchell's Plain. When at length driven out of this, they circled around Chaskawater, the Lookout Hill, and sometimes went as far west as the Sewell woods and south to the Big Swamp; but never, so far as I could learn, more than four or five miles from their headquarters. To this, they always returned in a few days, as it abounded in good cover and the peavine that affords their favourite winter food.

Another band that I knew in the Eastern Sandhills, showed the same adherence to a small locality along Pine Creek. The farthest south at which I found these at any time was Lee's Sandhill; that is, 4 or 5 miles from home. They always circled in this district when pursued.

From these observations and the corroboration of several hunters, I conclude that the winter range of the Mule-deer is but 5 or 6 miles across. In more open country, it may be larger; in rougher country, very much smaller.

During the summer, I suspect they are satisfied with a still more limited home ground, since the hunters and hunger—their two great incentives to travel—are then inoperative.

PLATE LXVI.—ANTELOPE IN NATIONAL ZOOLOGICAL PARK WITH DISCS CLOSED

Photograph by G. G. Seton

PLATE LXVII.—THE SAME ANTELOPE WITH DISCS HALF SPREAD

Photograph by G. G. Seton

PLATE LXVIII.—SKETCH OF A YOUNG ANTELOPE "LAYING LOW"

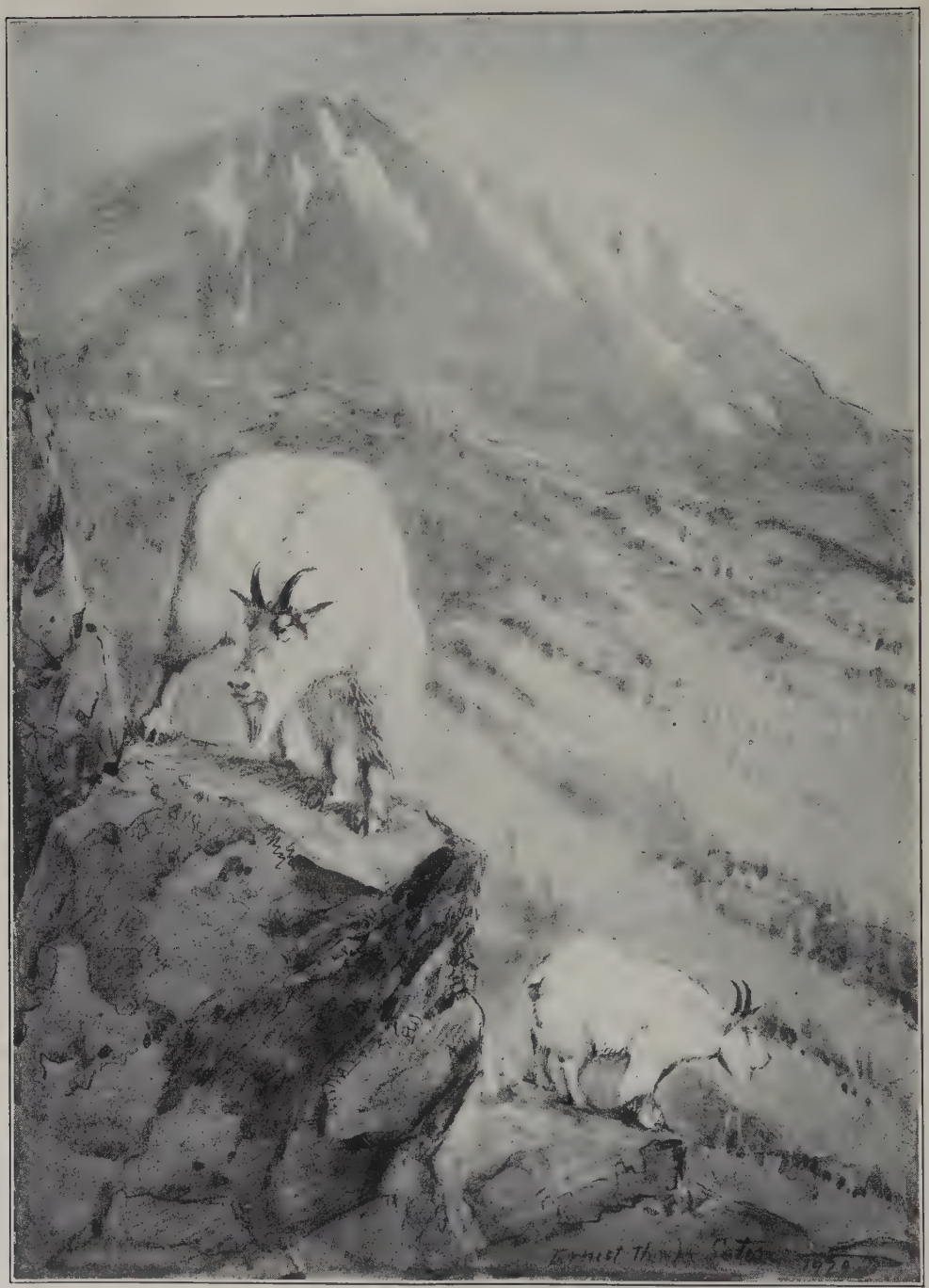


PLATE LXXI.—MOUNTAIN GOATS AT HOME

Drawing by E. T. Seton, 1898
Loaned by the New York Zoological Society

In Colorado, I was told of one large buck that for five years never left the little valley of Iker's Creek.

I remember a Deer, a barren doe, that lived all summer of 1892 in the poplar woods on the south side of Chaska-water (west of Carberry, Man.), within a mile of the lake (now, alas, dried up). I am not sure that it was the same animal, but think so, because the Deer were exceedingly scarce that year; I saw tracks of only one. None were those of buck or fawn. Those I saw were near the water, but none whatever in the belt of country farther away on each side. Its whole range, then, was less than two square miles.

Thus, each fresh observation seems to reduce farther the extent of the individual range. Nevertheless, I think that the Mule-deer's home region is larger than that of the Whitetail.

Migration

The Mule-deer is migratory in most of its range. Whenever so placed that a journey of 100 miles will take it from high, bleak, and stormy, to low, warm, and sheltered, it fails not to travel in due season, and settle in bands where there is sufficient promise of food and cover.

In the Bitterroots of Idaho, the Mule-deer seemed scarce when I camped there in September and October, 1902. I did not see half a dozen during that time, and the tracks were far from plentiful. Yet every winter, the guides assured me, 700 to 800 Mule-deer could be seen in a 6-mile walk along that same creek.

Edwin Carter of Breckenridge, Colo., told me, in 1899, that fall migrations of the Deer in Colorado were always downward from the high main range, southeastward and southwestward toward the foothills; and did not extend more than 50 or 60 miles. All the game make these migrations, and all are actuated solely by the search for food.

The best-defined migration that I personally observed, takes place each year in the Colorado Rockies. All summer long, the Deer on the Flat-tops flourish, as set forth later; but the first touch of winter, usually in the early part of October, sends out the whole population, almost in a body, to seek some winter range where the snow is less dangerously deep.

Following the well-known, well-worn pathways, they travel steadily downward and westward. Their numbers increase as they go; and the pathways become more worn and less numerous until, after a journey of 100 to 150 miles, they reach the open and semi-arid brakes of the Uintah country in Utah.

By coming here, they do eliminate the danger of deep snow. But the region is full of enemies, and the survivors of the host very gladly turn their noses to the hills again, as soon as the melting of the winter blanket permits it.

We have recent light on the home range as well as the movements of the species from the following interesting experiment with a Mule-deer doe:

"In 1921, Ranger Henry Skelton and his brother, stationed at Cascada, about 8 miles down the canyon from Yosemite, took an interest in a tame doe with two fawns. Incidentally, one of the fawns became so injured that it was mercifully killed. The doe became so tame that it could be petted. . . . A small bell was . . . placed around the neck of the tame doe. Having been thus marked . . . the doe was continuously seen in the vicinity during the rest of the summer. In the following summer (1922), this same doe with the bell was reported along the south rim of Yosemite Valley on the Pohono trail. During the past summer (1923), the same animal was reported many times from Little Yosemite Valley, a minimum distance of 17 miles from the place where it was first belled; and in the summer of 1924 along the Half Dome trail about 4 miles north of its 1923 habitat. She has wintered regularly at Cascada."[9]

Each spring, this bell-doe treks back some 17 miles and up some 3,000 feet, to summer in the upland valley, and there raise her fawns. She exactly typifies the behaviour of the species in all mountain regions.

But, in Manitoba, I have seen no sign of such migration. The Deer that frequent the Sandhills south of Carberry are, so far as I know, quite stationary, for the obvious reason that there they find plenty of food and cover, and not too much snow. They cannot better themselves by any seasonal change of surroundings. This, however, is probably of a different race from true *hemionus*.

Primitive Abundance

Reference to the map shows that the keen-eyed discoverers of this Deer recognized it for a new kind as soon as they entered its country; from which we may also infer that it was abundant.

H. M. Wright, of Los Angeles, telling of big-game conditions, says: "Three years ago, in Routt Co., Colo., I counted 161 Mule-deer all told, from horseback in a single day."[10]

At Denver, Nov. 1, 1899, J. A. Ricker told me that he had a friend who

[9]H. C. Bryant, Journ. Mamm., Aug., 1924, p. 201.

[10]Sat. Post, March 16, 1901, p. 6.

had never seen a wild Deer; so he took him out in the Deer country near Meeker, Colo., and in 3 hours showed him 43 Deer.

The September of 1901 I spent in the Flat-tops of Colorado, a favourite locality for the Mule-deer. During 27 days in wooded country, I saw 750 Deer within easy rifle range. And they were not in herds at the time, but scattered; indeed, all seen were either single animals or families. Each day, I saw from 10 to 80 Deer in a three- or four-hour walk. But the view was limited by the thick woods; so that I accepted the guide's estimate that they numbered as high as 200 Deer to the square mile in some localities. But all localities are not equally good; 50 to the square mile would be more representative.

Yet everyone assured me that the Deer had greatly decreased in late years; that, indeed, they were *not half* so numerous as five years before; at which time 100 to the square mile might have prevailed throughout this high and exceptional Deer country. The map shows that the chosen area is about 200 square miles, which would imply 20,000 Deer—figures which are more than justified by the reports of those who have watched along the main trail in the autumn, when these Deer move out to their winter home on the lower plains in Utah.

C. P. Russell, Park Naturalist in the Yosemite Park, gives the number of Deer in the Park at 30,000. These are presumably Mule-deer.[11] The Park is about 1,100 square miles; therefore, it carries about 30 Deer to the square mile. But it is a country of abundant rainfall and rank vegetation, so that it is not stocked beyond its food supply.

The Kaibab case (see later) argues against such a high rate of population. Although it has at present 30 Deer to the square mile, the experts agree that it cannot permanently carry more than half that much, for the Kaibab is a land of little rain and scanty forage.

Thus, we have 10, 15, 30, and 50 to the square mile in very favourable regions. But the range, as a whole, varies so in attractiveness that the Deer could not average more than 5 to the square mile. The total area of Mule-deer country is 2,500,000 square miles; therefore, 10,000,000 would be a liberal allowance for the primitive Mule-deer numbers.

Numbers To-day

There can be little doubt that the Mule-deer, in primitive days, were far less numerous than the Whitetail; but they are far easier to kill. Their habits and their haunts lay them open to wholesale slaughter such as the Whitetail never knew.

[11] Yosemite Nature Notes, March, 1925, p. 21.

E. J. Duchesnay, C. E., of Ottawa, Ont., tells me that in the late '80's, the winter haunts of this species in southern British Columbia were invaded by skin-hunters. Thousands of the hides were sold at 25 cents apiece, and the meat left in the woods to rot—a shameless destruction that finds a parallel among certain moderns, who, in their brutal blindness, are using priceless ancient papyri for fire-lighters.

Such methods could have but one result—the desolation of the range.

In Sept., 1897, I rode for 15 miles across the Badlands of the Little Missouri, with Howard Eaton; and saw in that time 3 Mule-deer. Ten years before, he had made that same ride and had seen 160. Since then, they have further diminished. These figures unfortunately represent the shrinkage of the whole population.

On the other hand, we have the Kaibab case. The Kaibab Game Preserve in Kaibab National Forest offers one of the most interesting studies in game conservation, as well as the problems that follow an unlooked-for measure of success. It was set apart by President Roosevelt in 1906, and contains about 1,000 square miles, half of it forest. It was estimated that it held 3,000 Deer. "After two years of protection, an estimate of 4,000 head was made. The estimate four years later, in 1912, was placed at 10,000. An estimate by the authors during the spring of 1923, and regarded as conservative, places the present numbers at 20,000."[12]

In 1924, Secretary Wallace sent a special committee of expert naturalists. They reported that there were about 30,000 Mule-deer on a range not fitted to support more than 15,000; that the food supply was being eaten out and starvation or other sweeping calamity might be looked for at any time, unless the number of Deer was speedily reduced.

How? First, by catching and shipping to other preserves; second, by selling hunting privileges; third, by killing and marketing the surplus by government employees. All three methods are so fraught with perils and scandalous possibilities, that nothing has yet been done. Meanwhile, the increase is going on at the rate of 25 per cent. each year.[13]

In the U. S. National Forests, there was a total of 440,814 Deer in 1922 (Official Census), of which 100,000 were Whitetails and the rest evenly divided between Blacktail and Mule-deer—that is, in round numbers, there were 175,000 Mule-deer in the Forests.

But this does not take in the National Parks, nor the open range, nor the range in Canada; which together would bring up the Mule-deer numbers to maybe 500,000. My estimate in 1909 was 400,000; for the nominal

[12]E. A. Goldman & S. B. Locke, American Forestry, Nov., 1923, p. 650.

[13]See National Parks Bulletin, Oct. 23, 1924.

range is but little shrunken, and the Deer preserves have in some measure offset the destruction.

Rate of Increase

When they have a fair measure of protection, the increase of the Mule-deer in their own range is amazing.

At Crawfordsville, Ind., is a herd of Mule-deer belonging to James F. Boots. They "are kept in a 4-acre enclosure. Mr. Boots writes that in 1899, he brought a buck fawn from Colorado, and nearly four years later he secured 2 adult does. From this stock he has had fawns as follows: 1904, 4; 1905, 4; 1906, 8; 1907, 10; 1908, 5; 1909, 10; from the 5 does then kept. All were raised except those born in 1908, the loss of which was attributed to excessive heat."[14] That is, in 6 years, 3 Deer became 44, not counting those disposed of.

In the Kaibab Forest, as we have seen, 3,000 Deer in 1906 became 30,000 by 1924, and are now increasing by adding 25 per cent. per annum.

These, however, reflect abnormal conditions. A drain of 20 per cent. each year is generally believed to be all the species can stand.

Economic Value

"No wild animal of the region," says Mearns, "is so valuable as this Deer, and especially to the Indian, whom it supplies with meat, clothing, shelter, and numerous utensils made from its skin, tendons, or skeleton. Its charred bones and various tools fashioned from the bones and teeth were usually found in the deserted buildings and cave dwellings formerly occupied by the extinct people known as the Cliff Dwellers, in the Verde Valley. Moccasins made from the neck skin of the Mule-deer are almost as good as those made from Moose skin."[15]

Signs, Tracks, Etc.

Deer beds are well known in the ranges. They are hollow nests in prominent but sheltered places on the hillsides and hilltops; roughly circular, and about four feet across. They are used continually, possibly by the same individuals, and some of them are remarkably deep. One which I examined on Wilson's Flat-tops, Colo., Sept. 26, 1901, was on the hillside facing east, and cut down 3 feet at the back to make a comfortable saucer shape.

[14]David E. Lantz, Raising Deer, Biol. Surv. Bull. No. 36, 1910, p. 45

[15]Mamm. Mex. Bd., p. 200.

At one point on the main trail where it crossed a burnt ridge, was what the guides called a "Deer hotel." It covered about 25 yards square, and contained about 70 beds; all of which bore evidence of having been used for years, as well as last night. There were 14 tiers of hollows like shelves; the longest contained 7 beds, the shortest 3. Many were large enough for 2 Deer. In each bed, the dust was pawed soft and fine.

I do not know of any sure way of distinguishing the tracks and dung of Mule-deer from those of Whitetail and Blacktail.

Food and Drink

Most of the small Deer of America are twig and brush eaters. Grass enters into the food list on rare occasions, and may at times be a staple in the prairie country. But the greater part of the Mule-deer's food is twigs, leaves, and buds of shrubs and trees.

In the north, their winter food is twigs, browse, what ground stuff they can get by nosing and pawing under the snow, and what tree stuff they can reach by standing on their hind legs. The various tree mosses, beardy-mosses, and lichen are especially sought after.

In the south, Mearns says: "Grass is not the principal food of the Mule-deer in Arizona. Grass is eaten, sometimes in large amount; but shrubs, leaves, and many small plants are more often eaten. It is extravagantly fond of acorns, especially those of the evergreen oak (*Quercus emoryi*). It usually feeds in the morning and evening, spending the hottest part of the day in the shade of a tree or rock. It is also apt to go to water in the evening or early morning, and, hunters say, on moonlight nights."[16]

In the far Southwest, there can be little doubt that the Mule-deer or Burro-deer like the Whitetail, the Sheep, and the Antelope, dispenses with water altogether in certain localities where there are neither springs nor pools, but where the cactus abounds. For the succulent leaves of the vegetable tank afford an adequate supply of drink to these creatures who know how to nibble the young leaves and stems without being utterly discomfited by the spines.

The Rut

The mating season of the Mule-deer is at about the same time as that of the Whitetail; that is, November is their Moon of Madness. But it may last until late in December. On Dec. 24, 1884, at Carberry, I saw a pair of this species in the full ardour of their time.

[16]Mamm. Mex. Bd., p. 200.

E. Carter, of Breckenridge, Colo., tells me that once, in the autumn, he saw two large Mule-deer bucks and a doe coming over a ridge; a long way behind was a small buck. The two big bucks, after many threats, closed in for a fight; and while they were so engaged, the little buck secured the doe. Was this a failure of the survival of the fittest, or was it proof of the supremacy of mind over matter?

Fatalities seem to be very rare as a consequence of these battles; and all that I can find recorded are the result of interlocked antlers. The antlers themselves are developed along lines that prevent the bucks hurting each other, rather than as deadly weapons; and in most cases, the battle is little more than a pushing bout.

Their Social Laws

The opening of the year with the Romans, the Indians, and all the wild things, including the Mule-deer, is the end of winter. Then comes the new birth, the new hope, the new start, the real new year. Let us, therefore, begin to follow the Mule-deer from the New Year's Day of the Wilds.

During the winter, the Deer are gathered in mixed companies of all ages and both sexes. The leader of these is nearly always an old doe; nevertheless, when escaping from danger, a buck, being faster, sometimes gets the lead.

In the springtime, as soon as may be, they take advantage of the melted snow and better forage, and scatter from the place where common interest in the food supply had held them during the long white months. There is, in particular, a repulsion between the sexes now; if two Deer go off together at this time, they are two bucks or two does, but never buck and doe.

The association of pairs of bucks is a curious, well-known fact. Among the Red-deer of Scotland, it is the rule for each big stag to have with him, all summer, a small stag as attendant or "squire." This follower is said to do sentinel duty for his superior at all times except during the rut, when he is most unceremoniously sent about his business elsewhere. Whether any parallel to this exists in the present species, remains to be seen. It is, of course, quite common to see two bucks living together all summer, and one is usually bigger than the other; but observations are lacking to explain their relationship.

The does become still less sociable as the May moon wanes, and are now to be seen feeding and living alone. Grass and twigs are their staple foods, but there is little of vegetable origin that they will not eat. They

drink twice a day, morning and evening. They are gaining in flesh now, and preparing for the great event of the year—the arrival of the young ones.

The Mother and Her Care

The young arrive during late May or early June. In some quiet woodsy hollow, the 1, 2, or rarely 3, fawns are born. They appear in the white-spotted livery of true fawn-deer. It is like that of a young Whitetail, but the ground colour is duller, paler, and yellower.

The mother hides them usually at different points in the same thicket; and comes to suckle them in the early morn and late evening, for 6 or even 8 weeks before she allows them to follow her. As late as July 30, in Manitoba, I have known the fawn to be hidden, though now well grown, and probably 7 or 8 weeks old.

The mother's vigilance and devotion at this time are most admirable. Every possible danger is studied, and every creature that might injure her little ones is either fought or misled to the utmost of her powers.

Judge Caton's account of a Mule-deer mother whose fawns were born in his park, is full of value. He says:

"She hid them in separate places, and only sought them at intervals to give them nourishment; and would never go near them, if she suspected she was watched, imitating exactly in this regard the Virginia Deer. When one was found and placed in a yard with a fence 4 feet high, she would sometimes jump the fence and visit it, but refused to allow it to suck till the other was found and placed in the same yard, when she nursed them both indifferently. I could not imagine the cause of her conduct to the first till I found she had another, for which she was evidently saving all the milk.

"I kept them in the yard but a couple of weeks, where they were visited frequently in order to tame them, but we made little progress in that direction; and believing they would do better at large, I turned them out, when she immediately secreted them, and it was 6 weeks more before she allowed them to follow her, never being seen to visit them except very early in the morning, or late in the evening.

"I would sometimes come across one in its seclusion, when, after the manner of the Virginian fawn, it would crouch as low down as possible, with its chin upon the ground and great ears laid back upon its neck; and if it believed itself undiscovered, would remain perfectly still, following me with its bright eyes till very near it; but as soon as it appreciated that it was discovered, would bound away . . . towards some ravine or thicket,

A remarkable Wyoming head

In collection of Lewis S. Thompson, of Red Bank, N. J.

Typical antlers of: 1. Whitetail. 2. Mule-deer

Typical Tails

1. Whitetail. 2. Mule-deer. 3. Coast Blacktail

PLATE LII.—DETAILS OF MULE-DEER

until out of sight, never stopping once to look back, as is frequently the case with the fawns of the Virginia Deer."[17]

Enos A. Mills describes the behaviour of a mother Mule-deer as he observed it from a watching place. He says: "Next morning, advancing in the breeze, I climbed up to watch the doe. She lay still nearly all day. Most of the time her ears moved nervously about as she caught sounds from this way and that. When an eagle soared overhead, she showed much uneasiness, but moved only eyes and ears. In mid-afternoon, she was startled by the fall of a rock mass down one of the crags near by. A short time after this, some Mountain Sheep appeared on the skyline above, posed, and looked quietly around. From the actions of the Sheep, the doe evidently concluded that all was well. She struggled slowly to her feet, giving a low call as she rose. Soon I knew that a fawn was having a warm meal. I do not know where the fawn had been hidden. Realizing that the Deer should not be disturbed for some days, I moved on to enjoy other scenes, and left her in possession."[18]

At Carberry, Man., on July 30, 1884, I saw a well-grown fawn that was found by Adam Shaw in the sandhills near Pine Creek. It had been hiding in the bushes, and was caught by the Dogs. Its bleating brought the mother. She circled about, but did not dare to attack the numerous foe. This fawn was raised on cow's milk and—protected by a conspicuous collar—continued for years about Carberry.

In the latter part of July, 1896, W. R. McFadden, of Denver, while riding in the half-open country on the head of Calf Creek, in northwestern Colorado, 60 miles beyond Hank's Peak, discovered a doe Mule-deer, with her two fawns, in the long grass. He crawled up to within 25 feet before they saw him. The mother's back, that is, the back of her head, was toward him, so he rose up slowly; but she caught a glimpse of the enemy, gave a low snort, threw up her head, and sprang to one side in three or four bounds, then commenced to "blow" or "whistle."

The fawns slunk into the grass immediately, skulking as low as possible, and after going ten feet or so in different directions, crouched and lay like sage-hens, with heads down flat. They were about ten feet apart, and although so near to McFadden, he had great difficulty in finding them; for, owing to the long grass, their stillness, and their colour, they were wonderfully well concealed. The mother ran off a long way, but circled near, whistling and trying to lead the intruder away.

On yet another occasion, this fortunate observer was favoured with a

[17]Ant. & Deer, p. 298.

[18]Adv. Nat. Guide, 1920, pp. 37–38.

peep into the nursery life and ways of the Mule-deer. Early one August, while travelling on the headwaters of Trout Creek (between Routt and Rio Blanco counties, Colo.), he saw a fawn with the mother, and marked down the little one. Although he knew within 20 feet of where it was, he could not find it in the grass. After looking for some time, McFadden hid behind a tree. In fifteen or twenty minutes, he saw a slight movement in the grass, then slowly there came up the head and ears of the fawn. It looked cautiously about without rising; then the hunter showed himself. In a flash the fawn's head went down, and it lay as still as a stone, with ears laid back on the neck. McFadden stood still within four feet of it; and at length it began to raise its head, but again dropped it on seeing him. He stepped nearer and stooped down; then the fawn leaped out and disappeared in the woods, not in the direction taken by its mother. This was a well-grown buck fawn, and had stub horns an inch long.

In the Late Summer

When I was at Marvine Lodge, Colo., in Sept., 1901, I met several instances of the mother Deer's devotion. One day, a red-tailed hawk, wheeling low and whistling over the hillside, was fiercely watched by a mother doe, whose bristling rump-patch showed what she felt. Doubtless she took him for an eagle.

At the same place, on Sept. 17th, William Purdy startled a Coyote, which ran across the river flat and up the farther hillside. A doe Mule-deer with two fawns was on the hill, and all three watched the Coyote with intense interest until it became clear that he was coming toward them. When he was within 50 yards, the doe left the fawns, and rushed out at the enemy. He ran as fast as he could, with the doe in full chase, for about 400 yards; then she gave it up, and returned in triumph to her young ones.

By the middle of August, the fawns are following their mother. An exceptional case came under my observation in Colorado, on Sept. 3, 1901. My pack train had halted while the men shot some grouse. After half a dozen shots, three fawns got up from the grass among the Horses, inspected them very deliberately, then quietly walked away.

By the first of September in Colorado, most of the young have lost their spots, and appear in the new uniform coat. On Sept. 7th, however, I saw two fawns still bearing well-marked spots. By the end of the month, all the young except the very late ones, are weaned, and are in the unspotted blue coat. They continue with the mother, however; and profit daily by her guidance and protection.

On Sept. 28th, I saw one in full blue coat, wandering alone and bleating piteously, announcing to all who heard that "here was a lost child"—an action not without its dangers, for a Lynx or Coyote was as likely to hear as the mother of the stray, and would understand the situation just as perfectly.

"Young Mule-deer make delightful pets," says Mearns. "In the autumn of 1887, twin male fawns were presented to Maj. E. K. Otey at Fort Verde, Arizona, and immediately gained the friendship of the entire garrison. They were still in the spotted coat, and were fond of cow's milk, but ate a variety of food. One was brought to a Jersey cow whose calf had been taken away. The cow licked it affectionately and permitted it to suckle, which it did with alacrity. These fawns soon ate potatoes, turnips, sweet potatoes, watermelons, apples, mesquite beans, and, in short, almost any vegetable food, to say nothing of shavings, sawdust, scraps of paper, rags, and other rubbish.

"They were gentle, fawning like Dogs on those they knew, and climbed upon one, with fore legs bent, to be petted. Full of curiosity, on entering a house, they inspected every article of furniture, and peered into every nook and cranny of the rooms. On seeing a Dog, they stopped short, standing like statues, eyeing it intently.

"Their gait was always extremely graceful, whether trotting or bounding along at a run. They liked to rub their heads against those whom they knew well, and to climb up upon them as a Dog does when asking to be petted; but they would butt and kick vigorously if strangers tried to pick them up or to carry them.

"Their voice was singular. When deserted by their friends, they bleated quite loudly and looked for them in all directions. At first, they made a low sound, like the squeak of a Rat, that gradually increased in volume until it could fairly be called a bleat.

"When sleeping in the pine forest near Flagstaff, Ariz., in 1886, my 'campaign' hat was pushed from my face early one morning, and I beheld a large buck standing beside me. It was a tame Mule-deer that ranged at will about the town of Flagstaff."[19]

Through the winter and spring, the young follow the mother, and get at least the advantage of wise leadership and example. When about a year old, they leave her, probably because she compels them to do so, as an instinctive preparation for the new family. There is reason, however, for believing that the young does continue to associate more or less with the mother all through their second season.

[19]Mamm. Mex. Boundary, pp. 200–01.

The Fawns and the Fantail

For over twenty years I had heard of the wonderful dwarf Deer called the Gazelle or Fantail. From the Saskatchewan country to the Gulf of Mexico, it was known to the old-timers; and delightful descriptions given of its rabbitlike size and fairylike horns.

The sporting papers received many letters from the old fellows telling of this marvellous cross between a White-tailed Deer and a Jackrabbit; but there was always some good reason why said horns or skull could not be produced "right now."

I sought in vain for the Fantail in the Upper Yellowstone country in Colorado and New Mexico; but always was too late. Then came reliable news that the last stronghold of the Fantail was the coulees on the west slope of the Bitterroot Mountains. That settled the question of our annual outing. My wife and I set out in Sept. 1902, to seek the Gazelle in the valleys of the West Bitterroots.

Yes, the experienced guide we secured knew the Fantail well—could take us right to a low valley where we could be sure of one or two.

The upper end of that valley was a favourite wintering ground for Mule-deer. We should surely find a few herded there, with an odd Lion and Moose; and Goats in the peaks near by.

Now went we forth with high hopes of joy among the big wild game.

At Hamilton, Mont., we left the railroad, and with a long pack train, crossed the divide by Lost Horse Canyon, to camp on the head of the Clearwater, not far from a range where, every winter, Mule-deer herds had fed.

Guns in hand, we sped away, and tracks in hundreds we saw; but not a single Deer. After travelling a mile or two down the valley, we found the Deer tracks gathered together, and all going one way—moving out. This was puzzling, for they were leaving a good wintering ground. We followed the trail of the herd; then suddenly came on the track of a large Mountain Lion also following the Deer. Now we knew why they had moved out. Had the deep snow come while they were there, they would have been shut in, absolutely in the power of the Lion. He would have settled down comfortably for all winter; and when spring came, there would have been a fat Lion, but not a Deer left alive.

This was the situation, and the Deer's answer was "pull out" while it was easy to do so.

By careful trailing, we learned of the Lion's crafty pursuit; then that he was stalking a big doe that was followed by her two fawns.

A 32-point head

33⅞ inch spread; taken about 1884 in Middle Park, Colo. Now in E. Carter Collection

A 3-antlered head

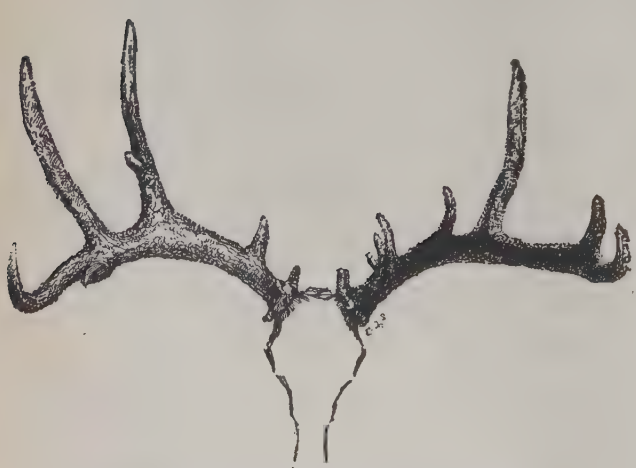
From Meeker, Colo., 1892. Collection of W. R. McFadde Denver. Spread, 25 inches

Br. Columbia head

In Vancouver Club, Victoria, B. C. Spread, 30⅔ inches

From Vernon, B. C.

Collection of W. F. Cameron. Spread, 36 inches. From pl by C. W. Holliday; over 50 points



Collected by G. M. Fear at Banff, Alta., in fall of 1893

The buck was very old and very large; antlers still in velvet. Spread, 39 inches

A 29-pointer

29-inch spread. Taken at Banff, Alta. Now in collection T. Wilson

PLATE LIII.—REMARKABLE ANTLERS OF MULE-DEER

Down the winding valley, and the tracks growing deeper. Then there were signs of a rush—a struggle—and there on the ground lay the body of the Deer, still warm, and yet partly devoured.

Of course, one cannot stalk a Cougar. His sense and powers are ten times as good as yours. But we could follow the trampled wake of the down-driven herd, till in the wooded valley among brush and grass, it was scattered and lost.

It was nightfall now, and our descent had brought us to a wide meadow with a meandering stream. The flat was dotted with willows, and down its centre was a long, dense thicket.

Here the guide gave us a new and stirring thought. "This here flat is the place where I could always find the Fantail Deer."

Herds of Mule-deer and hunting Lions were of small importance compared with the new possibility; and we formed skirmish line to drive the great central cover, noisily but with every sense alert.

The thicket was a mile long, and about 200 yards wide. So we three—the tenderfoot, the guide, and myself—some 50 yards apart, went crawling through its mazes.

After about 15 minutes, the guide gave a short, sharp whistle, and came quickly.

The tenderfoot was to be the sharpshooter; and excitement was tense when the guide whispered, "See, see! Two Fantail Deer—regular Gazelles!" He pointed farther on to an outerside of the thicket. There, much hidden by the willow stems, were the forms of two tiny Deer, gazing curiously our way. It was a good hundred yards, but the tenderfoot was a shot. She crooked her elbow, steadied, and fired.

One Gazelle stood gazing, the other lurched and then fell; but before we could gasp, "A kill!" it sprang up and loped across the gravelly bar of the creek, then disappeared in a far-side cover.

We hurried to the place. Yes, there was a splash of blood on the stone but not much.

Then the tenderfoot, being a woman, began to weep. She said, "I don't mind killing, but to wound and send him off to a lingering death is horrible. I wish—I wish—I had not fired."

I followed the trail a little way, and said "Well, be sure of this: It is not a bad wound. If he bleeds at all, I can get him. He cannot get away. So to-morrow he will be either all right, or else hanging by his heels in camp."

It was slow trailing, as the creature had kept on the stones for long, and then had taken to the underbrush. There was a faint drip of blood

about every 25 feet; but I followed it slowly, and when night came, it had led me back nearly to camp. There the Fantail track was lost on the trampled ground where grazed our 28 horses.

Next morning, with a reassuring "He can't escape me," I set out to look for the trail. A quarter of a mile from camp, I set to work to scrutinize every foot of ground in a great circle. After an hour's work, I found a faint smear of dry blood on a leaf. A long whistle brought the tenderfoot, gun in hand. Faint hoof-prints there were, and these I followed slowly westward on the hard ground. Then they turned northward, and began to climb the sandy hillside.

Now I could follow fast. In a quarter of a mile, I read the plain record of where the Fantail had slept. There was a little—very little—blood near the mark of one hock. The Deer had risen once, then lay down again. The tracks leading out were very fresh, maybe made at our approach. The steps showed that it had not run, but walked away. Then I found a little pile of "scats," the black pellets of its food by-product. These were few, but all in one pile, showing that the creature was not alarmed, and had stood during the voidance.

The tracks were plain now, and I could follow so fast that the tenderfoot could scarcely keep up. After a hundred yards, another pile of scats, now steaming hot. The game was surely within 50 feet. I waited for the tenderfoot, and pointed to the next thicket only 20 yards away. With rifle cocked, she went slowly, silently forward. Within 15 yards, the gun flew to her shoulder. I saw a moving form of brown and white as she fired. A tiny Deer sprang down the hillside to land some 20 feet away, and there lie still.

I rushed to the spot, ablaze with the eagerness of sportsman and naturalist combined. At last I had run down the famous Fantail Deer the Gazelle of the valleys. The tenderfoot's aim had been true; there she stood above it, as I hurried to feast my eyes on the Deer, so long a myth.

I gazed and saw—*nothing but a Mule-deer fawn*—undoubtedly one of those whose mother the Lion had killed. The slight wound the day before had been a mere skin wound in the hind leg, but at last I had the whole creature.

That specimen is now preserved in the U. S. National Museum; and at the spot where we buried the offal of the fawn, we buried also the myth of the Bitterroot Fantail Deer.

The Father

So far as known, the buck takes no interest in the young; that is, he lives up to the rule of polygamous animals by ignoring the mating tie as soon as the season of its grosser pleasures is over. I do not, however, believe at all the notion that the buck makes a practice of killing the fawns. The thing is impossible on the face of it; this would indeed be "race suicide."

There are numberless cases of bucks killing fawns, but not, I think, as deliberate murders. It is rather the result of the impatient blow or thrust of a strong Deer at another that gets in its way; only in these cases the second one was so weak that the result was fatal.

Amusements

Judge Caton has a very poor opinion of the Mule-deer character. He considers it cowardly and treacherous above all its kind; but says:[20] "The Mule-deer is the only one I have ever seen manifest a clear and decided disposition to play. This they do something after the manner of lambs, by running courses and gambolling about, and running up and down the bluffs, manifestly for amusement only. I have once noticed something like this in a common Deer, but at the best it was the faintest sort of play, if indeed that was its meaning. . . . But the Mule-deer not only amuses itself in the way described, but loves to have me join him in a little sham fight; and if I handle him a little roughly, or try to throw him down when he rears up and places his feet on my shoulders, he will recover and jump sideways and backward, twisting himself into grotesque attitudes, though he does this in an awkward way.

'I have not observed this disposition to play, after the animal is two or three years old, and the male seems more inclined to it than the female. I elsewhere mention that he sometimes appears to become very appreciative of his own importance, when he will strut round, his tail elevated to a vertical position, as is observed with the male Goat."

Similar testimony is borne by many Colorado hunters. McFadden tells me that he has seen *five* of the fawns playing together in this same way.

Winter Life

During winter, the Mule-deer continue in mixed bands of all ages and both sexes, usually under the leadership of an old doe who is the great-grandmother of most of them.

[20] Ant. & Deer, pp. 296–97.

In some favoured parts of the country, these winter bands become very large; for example, in the Bitterroots, as already noted, and along the brakes of the Yampah; also, according to E. J. Duchesnay, C. E. About April 1, 1892, as he was riding around the southwest corner of Dog Lake, which is an expansion of Okanagan River, he came on numerous bands of Mule-deer; and during the day saw between 400 and 500. At one time, the bunches were so thick that the whole of a hillside seemed moving with Deer. His description reminded me of Caribou on the wolds of the North.

My guide in the Bitterroots, Abe Leeds, of Hamilton, Mont., described an interesting circumstance in the winter life of a fawn. In the winter of 1898–99, he went with his partner to the Upper Clearwater to build a shanty as headquarters for hunting trips. Deer were plentiful; and some began, as usual, to hang around where they salted the Horses. Among them was a little fawn of the year. He was a miserable, pot-bellied little runt, seeming as though he had been left at an early age to shift for himself. He spent his whole time about the camp.

The men began to put mossy branches where he could get them; and soon he came regularly to be fed. Each day, they cut down a mossy tree for him; and at length he would come tearing down the hill as soon as he heard the axe; then would stand with his head cocked to one side, watching till he saw where the tree was going to fall, and would be into the top as soon as it touched the ground.

A big buck also learned the meaning of the tree-felling, and used to come when the men were gone, and chase the little runt away. One day the hunter's partner saw the buck throw the runt head-over-heels; so he seized his gun and shot the bully dead. This was the only Deer they killed out of season.

When they came away, in the springtime, the runt was there still, but had now grown quite fat.

The Enemy—Snow

Next after the rifle-bearing hunter, the worst enemy of the Mule-deer is deep snow. It forms a league with famine to hide their food on the ground, and to prevent their travelling in search of that which grows on the trees. Also, it betrays them to yet another foe—the Mountain Lion or Cougar.

The Cougar

When the Mule-deer bands come down the mountain, to settle in winter cover, the Mountain Lion does the same. Now he knows just where to find

Antler of emasculated buck

Colorado, Feb., 1896. E. Carter Collection

From Swan River, Man., Dec., 1906

Collection of E. W. Darbey

Taken near Meeker, Colo., about Nov. 1, 1900, by John Marshall

Spread, 26 inches

Taken at Banff, Alta., by T. Wilson, fall of 1898

At X the bone is 5 inches wide

Taken in Routt Co., Colo., by W. R. McFadden, 1896

Taken near Meeker, Colo., about 1898

Spread, 25 inches. Collection of Blain & Purdy

PLATE LIV.—FREAK ANTLERS OF MULE-DEER

his prey; now, thanks to the snow, it cannot escape him. He comfortably camps, then, in the locality, as in a private game preserve, or like some epicure with a larder stocked with game—so richly stocked, indeed, that he is tempted into shameful waste. One Deer a week is all he can possibly use; and yet I have been assured by such guides as Goff and Leeds that in wantonness of slaughter, he will kill two or three a day, until the band is all cleared out; then travel complacently over the snow in search of another winter colony.

On Jan. 27, 1914, I was on a Cougar hunt in the Yellowstone Park with Henry Anderson and his pack—two hounds and two airedales. Although our Dogs were on the trail all day, that did not prevent the Cougar killing and feasting on a big buck Deer as soon as he felt hungry.

These observations refer to the northern Rockies, where the snow is very deep, and persists for several months. In the South, the desert, the land of little rain and less snow, we find the Cougar of the same temper.

Mearns says, discussing the Burro-deer or Desert Mule-deer: "The Mexican Cougar or Mountain Lion (*Felis oregonensis aztecus*) destroys great numbers of Deer; and it is not uncommon to find the remains of Deer that have been recently slain by it, and hidden in caves or among shrubbery or rocks. In 1885, I found a large male Mule-deer that had been killed but a few hours before by a Cougar. There were evidences of a severe struggle, which showed that the Cougar—perhaps a small one—had encountered difficulties in the undertaking. On Dec. 11, 1885, I found a deserted den of Bears in a cave on Clear Creek. In it were many broken bones of Deer and the fresh tracks of a Cougar."[21]

El Enemigo—El Coyote

There can be no doubt that the Coyote is to be listed as a dreaded enemy of the Mule-deer. He ranges in every part of this Deer's range, and his destructiveness is limited only by his powers and opportunities. Of this, I have seen nothing personally, but Mearns writes: "Coyotes and other Wolves follow the Mule-deer and drag down those that have been disabled by wounds or sickness; but they do much greater damage by destroying newly born fawns that have been left hidden by their mothers."[22]

A still more serious indictment is offered by L. L. Thompson, writing of his experiences in the old trap-line in the Bitterroots of Idaho. He says:

"In returning over my line one afternoon, I saw four Coyotes in the act

[21]Mamm. Mex. Bd., p. 201

[22]As above, p. 201.

of killing a Deer. They had previously run the Deer off from the mountain side and down to the river. Here the Deer had tried to throw the Coyotes off its track by taking to the icy water, and had swum down stream several hundred feet, and come out on ice on the same side it went into the stream; but evidently the Coyotes were on to his trick, or else they were in close pursuit, probably the latter—for on rounding a sharp point, I first noticed the Deer, and water was still dripping from its body; which went to prove it had just gotten out of the water.

"A moment later, I discovered the Coyotes. First one and then another would dash in and attack the Deer's flanks and hind-quarters. The Deer each time succeeded in shaking them off, but was growing weaker with each struggle.

"During this time, I was sneaking up in order to get within rifle range, and kept under cover as much as possible, in the fringe of trees along the river bank. The Coyotes were so interested in bringing down their quarry, that I was able to get within 50 yards of them without being observed, and succeeded in killing two of them the first two shots. I emptied my rifle at the other two as they made off into the brakes, but without success. The Deer disappeared as soon as I started firing. On reaching the spot where the struggle had taken place, several splotches of blood and bunches of Deer hair lay on the ice, and I'm sure it would have been only a matter of a few minutes until the Deer would have perished from the four-cornered attack."[23]

The Eagle an Enemy

That the golden eagle or war-eagle will kill and carry off fawns has long been known. But the fact that it will attack full-grown Deer comes as a surprise. E. Grandjean, forest supervisor of the Boise National Forest, is quoted in *Field & Stream* for May, 1921, as follows:

"The golden eagle is very destructive, attacking especially the young of Mountain Sheep, collecting a heavy toll of our Mountain Goats, and also destroying a large number of fawns. They kill also full-grown Deer. This is an indisputable fact, since we have records of instances where these birds have been seen killing mature Deer. The attack in these instances is very similar each time. The eagle strikes the Deer on the back of the head and neck and thereby, by its first assault, frightens the animal, and then continues to strike it until the Deer is finally overcome. This is, of course, on the open hillsides, and the Deer are killed before they can reach the protecting cover of the forest" (p. 32).

Doctor Mearns, writing of the Mule-deer in the Desert, says: "On

[23]Hunter-Trader-Trapper, Dec., 1925, p. 27.

several occasions, I saw golden eagles, always in pairs, following herds of does and fawns; but I never saw them make an attack upon the Deer, although I felt certain that they were following them with that object."[24]

A more completely detailed account is furnished by Harry Petrie, of Denver, Colo. He writes:

"Last September, while my partner and I were hunting in the Williams River mountains, we discovered on the summit of a ridge a large Mule buck, running away, about 250 yards distant, apparently having winded us. Soon an exceedingly large gray eagle made a dive at the buck, who dodged, shook his head and increased his speed. The eagle made several plunges, coming close to, but not taking hold of the Deer. In a moment the buck was in the protection of a quaking asp grove, and a small 2-point buck came in sight, going in the same direction as the larger one.

"The eagle immediately turned his attention to this one. This was the more exciting event of the two. The small buck made strenuous efforts to get away, increasing his speed and dodging repeatedly, as I have often seen a Jackrabbit do when closely pursued by a large hawk. At last the eagle settled directly on the buck's withers. There he remained with wings spread for a number of seconds, until the buck gained the grove that had sheltered the larger Deer."[25]

In the first case, it looks as though the eagle was afraid of the great horns. One can imagine that a doe or a fawn would have stood a poor chance of escape.

Troubles and Accidents

Those who have not thought of it before, are surprised to learn that the old idea of man being *the* diseased animal is without foundation. To such it comes with a shock when they learn that practically all animals are more or less diseased, that none are perfect. The Mule-deer has many troubles of its own, as the following record which I made in Routt County, Colo., will show:

Sept. 2, 1901, Lost Creek. Found a dead fawn much inflated; did not dissect it.

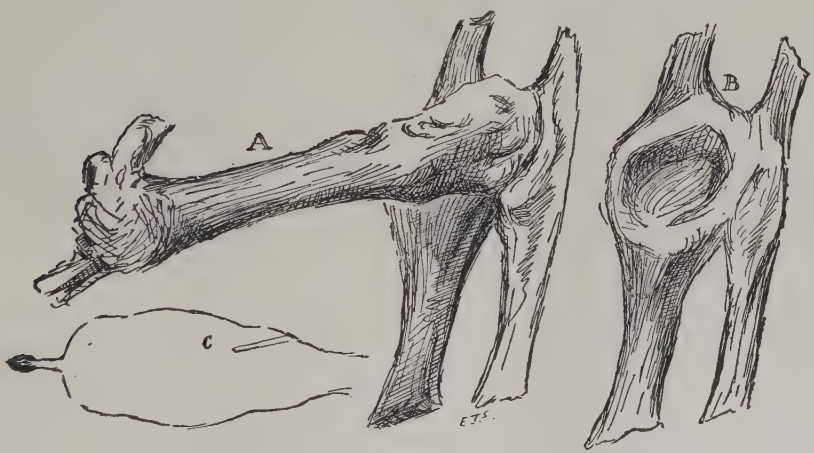
Sept. 6, Pagoda Creek. C. E. shot a 2-year-old young buck; it weighed 153 pounds and seemed in perfect condition; but it had in the back a hole an inch deep, as though it had been recently snagged. In its intestines was a worm 12 inches long and $\frac{1}{8}$ inch thick; in the fat of the loins was a hydatid cyst (embryo of tapeworm) like a bag of jelly about 1 inch by 2 inches.

[24] Mamm. Mex. Bd., p. 201.

[25] Recreation, Oct., 1898, p. 305.

Mule-deer freak antlers

1. Killed in Egeria Park, Colo. Now in E. Carter Collection. 2. Mule-deer horns of Whitetail type. Taken near Meeker, Colo., 1894, by E. Campbell. 3. Taken near Meeker, Colo., in 1899, by Charles Givens.



A. The snag. B. The cap formed over the end by the ribs. C. The Deer, showing course of snag

PLATE LV.—MULE-DEER FREAKS AND ACCIDENT

This buck had both ears split; it looked, the guide said, like the ear-mark of the "Cross-Bar Z" Cattle Ranch.

Sept. 12, Pagoda Creek. L. H. shot a 3-year-old buck; it weighed 226½ pounds. It was very fat and seemed free of all disease. It was accompanying a much larger buck.

Sept. 18, Lost Park. L. H. shot a large buck. At first sight, he thought it was an Elk, it was so large and pale in colour. It turned out to be a miserable cripple. It had evidently snagged itself badly some weeks before. There was a large hole into the belly; the entrails had been pierced by the spike, and much of their contents was loose in the cavity. The small bowels were highly inflamed, and of a dark purplish red. In the omentum, I found over a dozen of the hydatid cysts. One corner of one lung was badly congested; the horns were large, but still in velvet. It was yet in red coat, but this was much bleached, very scanty, and harsh. It was miserably thin and poor; and I wondered that it could continue to live with so many ailments.

Sept. 21, Wilson's Flat-tops. J. B. shot a fine, fat buck. It weighed 243½ pounds. Its right hind leg had been broken in the middle of the shank (metatarsus) and healed in a clumsy knob. This Deer seemed quite healthy, but I found in the fat on the bowels 5 of the hydatid cysts.

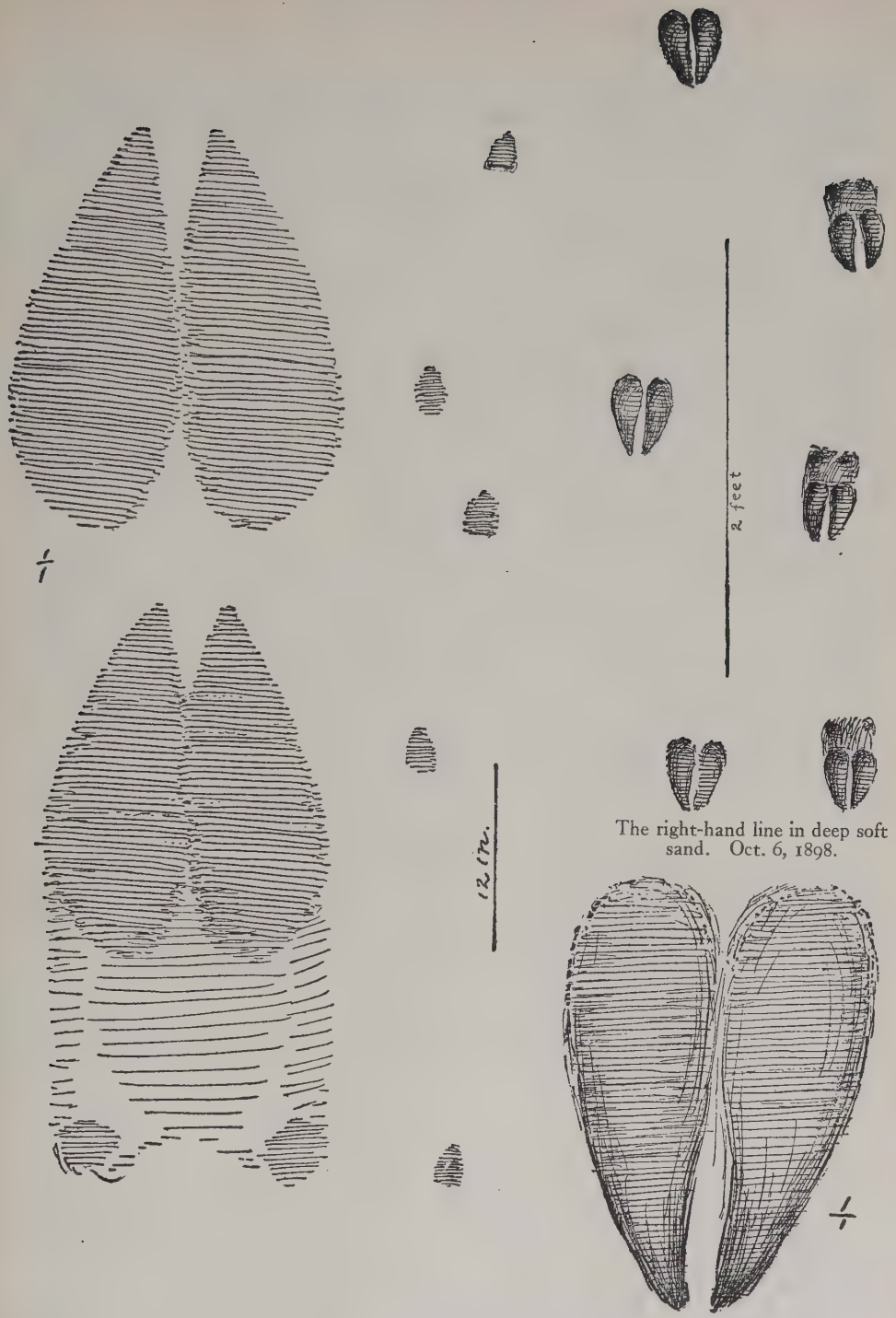
Sept. 25, Wilson's Flat-tops. Found a male fawn, dead about a week. In blue coat and fine condition, the only wound a small hole in the belly just under the loose flank. Possibly made by a buck's horn, or perhaps snagged. I did not dissect it.

Sept. 26, Wilson's Flat-tops. Down by Deer Creek I found a female fawn, evidently dead about a week. It was in the full blue coat, and fine condition. Its right eye was bloody, and there was blood at its nose as though it had been killed by a blow; but its neck was not broken. It was much blown up with gas. I did not dissect it. Goff says that at this season many die of a "bloat."

Sept. 27, Wilson's Flat-tops. W. P. shot a young buck; it weighed 150½ pounds. It had no diseases nor parasites, but the hoofs of the front feet were much splintered and broken, nearly an inch lacking on each.

Oct. 1, Wilson's Flat-tops. G. G. S. shot a large buck; it weighed 215¾ pounds; was in good condition. The only sign of disease was a small body like a black bean in the omentum, but it had been snagged twice, slightly in the breast and very deeply in the ham. It had a front leg broken, but that was now healed.

Says Mearns: "I have known of but one case of the death of a Mule-deer from accident. On the wagon road from Fort Verde to Flagstaff,



The right-hand line in deep soft sand. Oct. 6, 1898.

PLATE LVI.—TRACKS OF MULE-DEER

Arizona, on a high, juniper-clad mesa, I looked into a wonderful cave, in lime rock, beneath a layer of volcanic scoria; and could discern the horns and skeleton of a Mule-deer that had gotten into this pitfall, probably when the entrance was blocked with drifted snow."[26]

"When frightened, Deer pay no heed to the sharp-spined cactus; and all that I have skinned have had cactus spines embedded in the tissue next to the bones of the limbs. These must cause pain, as before becoming encysted, much inflammation is set up."[27]

Finally, a curious case was shown me by E. Carter, of Breckenridge, in Oct., 1899. In 1887, one Eli Loback had killed a Mule-deer in Egeria Park, Colo. On being skinned, it proved to have been badly snagged some years before. The snag, a dry branch of spruce, 8 inches long and $\frac{3}{4}$ inch thick, had pierced the shoulder blade, broken two ribs, and entered 8 inches into the chest, where it still rested. It was completely encysted. The animal was fat and healthy. (See Plate.)

The Mule-deer in the desert is troubled not a little by parasites. Mearns says: "Parasites also cause them much annoyance, and endanger their lives by affecting their sense of hearing and of smell. Ticks infest their ears, penetrating to the drum, and sometimes blocking up the external auditory canal. In one instance, a dozen ticks were removed from the canal, where they had created an intense inflammation, the skin having peeled off entirely, leaving a red, inflamed surface. These ticks were preserved, and subsequently identified as the western cattle tick (*Ixodes bovis*) by Mr. William Beutenmüller. A large grub-like larva (probably *Oestrus ovis Linn.*), measuring 25 by 10 mm. when not in motion, was found to be a very common parasite upon the nasal mucous membrane of this Deer, in central Arizona. These parasites must be a source of almost intolerable suffering to the Deer, besides rendering them an easy prey to their enemies."[28]

Thus one may well realize that trouble is not exclusively the lot of man, and that our brethren of hoofs and horns have their full share of aches and pains, and without the human mind to point the way of comfort, or to aggravate the ills by dwelling on them.

Licks and Scrapes

The only sanitary effort of this species seems to be the periodic seeking of a salt-lick. So far as I could learn, it does not make a wallow.

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[26]Mamm. Mex. Bd., pp. 201–02.

[27]As above, p. 202

[28]As above.

In origin similar to the beds, but probably akin to the wallows of Elk and Moose, are the "scrapes." These are simply areas of about a square yard, scraped clean of grass and leaves. They are made in autumn, and are usually in moist places. I have seen many of them in Colorado; but have no evidence beyond the opinions of hunters, that they are made by the bucks.

Curiosities of Deer Life

Again and again I have had my attention attracted to lurking Deer by the bluejay and the wiskajon. Every hunter tells the same story. But it seems that it works both ways—these birds are as likely to betray the hunter as the game. Many times they warn the game of the approaching hunter; and just as often inform the hunter of the presence of the game. What good these busybodies get by their interference, I cannot comprehend. The case is of a kind that is widely known in all game countries.

The following I have heard in various forms. No doubt, it has a foundation in fact, however slight that may be.

"*Gold in a Deer's Mouth. Denver, Colo., Dec. 11* [*1901*].—J—— F—— of Routt County has brought to Denver a Deer killed a few days ago in Routt County, whose lower teeth are covered with gold. It lies in a thick cake all over the lower jaw.

"The Deer had been drinking in a spring, the waters of which were impregnated with flour gold, and the salt saliva in the animal's mouth had caused the gold to adhere to its teeth."

Vernon Bailey refuses to accept this. He discovers several discrepancies on analysis. He says in effect: "Spring water is never impregnated with gold; and if it were, it would not be flour gold. The Deer's saliva is not salty; and if it were, it would not make the gold stick to the teeth, if there were gold, but would wash it off if it did stick. It is quite possible, however, that certain roots and lichens do stain the teeth golden yellow. In other words, the story is a "diaphanous myth"; which is Greek, but may be perfectly translated into Saxon English as "utter bosh."

Voice and Signals

It seems to be a logical conclusion that the Mule-deer, with its unusually developed ears, is a creature in whose world sounds are of cardinal importance.

First on the list should be those made by the creature itself. The one most often heard is the "snort" or "blowing" of curiosity. The next is the whistle, simply a higher pitched and longer snort; this expresses alarm.

The hunters generally credit the mother Deer with the utterance of a low, soft, murmuring sound, as she comes to the place where the fawn is hidden; a sound intended, no doubt, to let the little one know who it is that comes. Under circumstances of dire extremity, the does at least will utter a bleating like a Sheep. Roosevelt credits[29] the bucks with uttering a barking challenge during the rutting season. The fawn, as is well known, bleats to call the mother's attention, especially when hungry or lost.

Another sound that is much used, is made by stamping the forefoot. I have heard it when it seemed to mean defiance; but usually it means alarm, and spreads news of danger among those farther off.

Senses and Powers

The keenness of its senses is commented on by many observers. Dr. C. H. Barry, of Durango, Mex., writes: "I believe they have the most acute ears of any animal extant. When lying down, the ears are working back and forth all the time. Deer can see a leaf move 40 rods away. I believe they depend almost entirely on hearing and sight for the detection of an enemy."[30]

The same sportsman prefaces the above remarks with a statement that Mule-deer at least, unlike Whitetail, do not rely much on the nose for warning of an enemy's approach. He says:

"I should like to take issue with some of the old-timers as to the sense of smell in Deer. I wear Moose hide moccasins and have walked up within 30 feet of Deer lying down. They paid no attention until they saw me. Have had Deer pass within 20 feet of me. Of course, that was when I was standing perfectly still; the slightest movement would send them flying."[31]

One day in Sept., 1902, I walked for a mile along a ridge in Colorado. On each side of me was unlimited woods, full of Deer. The breeze blew on my left. As I went, a Deer jumped up every minute or two on my right, some of them as far off as 400 yards. None jumped up on my left. Undoubtedly, it was the warning carried by the wind, that started the Deer I saw.

Swimming. This Deer can swim if it must; but it rarely needs to do so. A photograph by Wallihan shows it to ride very low in the water. I imagine it to be the least aquatic of those found in our country.

[29]Deer Family, p. 48.
[30]Recreation, Aug., 1902, p. 118.
[31]As above.

Its Deep Sleep

J. B. Goff tells me that he has often come on Deer standing asleep in daytime, with tightly closed eyes; and has sometimes approached within twenty feet. One day he watched a ranger, named Jack Dunn, as he crawled up to one of these sleeping Deer and caught its hind leg. Then ensued a remarkable fight, in which finally Dunn, though much scratched and dragged about, succeeded in killing the Deer with his knife.

T. C. Sackett, a mining engineer of Montana, told me (Jan., 1914) that he had often seen both Mule-deer and Whitetail sleeping buried in the snow, nothing out except the snout. This referred especially to Deer around Yellowstone Park. His partner, N. C. Reegan, confirmed the story.

Freezing

Every hunter learns, and every wild animal seems to know instinctively, the value of "freezing," that is, becoming still as a frozen thing, when a stranger is discovered in the woods. The motionless object escapes notice, and is enormously advantaged to observe others. The Mule-deer is an adept at freezing.

On September 3d, I met a young buck some 40 yards off in the woods. We both froze at the same time. He kept his pose for half a minute, then turned and bounded off.

On the evening of Sept. 6, 1901, my wife and I took a walk from camp, near Pagoda Peak, Colo. A hundred yards away, in an open glade, was a Deer. It raised its head, gazed at us, and froze. It was in shadow, and we were against the sky. We gazed at each other for a minute, then I whispered, "Let us see how long by the watch it will keep on," and cautiously opened my watch. After one and a half minutes, my companion said, "Why, that is no Deer, it's a stump." She raised her hand—and the Deer bounded off.

But the most interesting case was noted next day. As I went through the woods at sundown, I came on a doe. She was walking through an open place about 60 yards away, but she saw me just as I saw her. In fact, we met face to face. At the same moment, we both froze and stood gazing, each waiting for the other to make the first move.

I waited three or four minutes at least, but she did not stir. Then it occurred to me to time her. I very slowly slid my hand up to my watch, and stood as before, the Deer still watching me.

One minute—two minutes—five minutes went by, and still the Deer did

not move. I began to wonder if I had not made a mistake after all, and watched a stump that had somewhat the form of a Deer. Then I thought, "No, I *saw* her walk there." Six minutes—eight minutes—ten minutes passed, and still the Deer stood.

"It is not possible," I said to myself, "no Deer would stand like that for ten minutes. And yet there she is. That was plainly a Deer when it went there." I waited another minute—still no move. "I'll give her five minutes more, and if there is no move I shall know I have been fooled by a stump."

Eleven and a half minutes, not counting the time before my watch was out, and there was a change, for it *was* a Deer that had been so intently watching me all the time; and it so happened that she now decided that *she* had been fooled by a stump. She changed her pose, turned to graze, and I had won the game of "freeze." I brought my camera slowly to bear and snapped it, but the light was too poor to get a picture. The Deer now saw *me* move, and bounded away.

The Way of His Feet

When walking or trotting, the Mule-deer's action is like that of its cousins. But when speeding, it does not run like the Whitetail, but goes with a peculiar bounding, in which, with little leg movement, it rises as by an effort of the toes, leaping from all four, and landing on all four. This action is seen also in the Coast Deer, but is quite different from the much swifter running of Whitetail and Antelope.

A result of this surprising gait, is the success with which the Mule-deer ascend and descend rugged hills and cliffs.

Mearns writes of the fearless way in which the Desert Deer approach a canyon. He says: "When hunting a herd of frightened Deer, near Fort Verde, the terrified creatures rushed over a vertical cliff, at the edge of a mesa, and disappeared. Looking over the edge, and expecting to see them all dead and mangled below, I was astonished to see the herd strung out along several narrow ledges, whence they all reached the bottom of the canyon in safety; and I am glad to say that not one of them fell to our guns.

"On another occasion, in the middle of July, 1884, when riding over a mesa only a mile or two east of Fort Verde, in the central part of Arizona, I came close upon a doe and little fawn that were lying in the shade of a red juniper tree. They sprang to their feet, looked at me an instant, and cantered to the edge of a deep canyon close by and disappeared. I rode instantly to the edge of the canyon, but the Deer had already reached the

bottom of it. It seemed incredible that they should have done so, as the canyon was deep, precipitous, and very rocky; and this fawn could not have been more than two months old. It was indeed a remarkable feat of agility.

"Having reached the bed of the canyon, both stopped and gazed fixedly at me, then alternately trotted a little way and stopped to look. Riding along the bluff, I startled them again, and watched them gallop off a mile or more toward Beaver Creek."[32]

In various parts of its wide range, this fine animal has received names that reflect one or other of its peculiarities; thus Mule-deer or Burro-deer from its ears, Muletail-deer and Blacktail from its tail. But the most descriptive and picturesque of its many names is "Bounding Blacktail"; (taboo, alas, on account of confusion with the Coast Blacktail). In this we see the record of its most wonderful gift.

I shall never forget the first time (Nov. 7, 1884) I saw this bounding in the Sandhills near Carberry. It was my first sight, not merely of the Bounding Deer, but of any wild Deer; and the marvellous manner of its flight, as entered in my journal of the time, runs thus:

"I stood gazing at the graceful creatures for a moment or two; then they moved off a little, and commenced to rise in the air with a peculiar bounding movement, although without any apparent effort. They seemed to be playing, their movements were so entirely without any semblance of haste or alarm. It did not occur to me at first that they were running away. The idea I had in my mind of a Deer speeding was formed on seeing a Dog or Fox. I expected to see the laboured straining and the vast athletic bounds. But, no! these evidently had not yet commenced to run, they seemed to be merely bounding up and down in the air; and it was only on noting the different hilltops which their feet touched lightly in succession, and by seeing the fair, rounded forms rapidly becoming smaller in the distance, that it dawned on me that *now* they were flying for safety.

"Higher and higher they rose each time; gracefully their bodies swayed inward as they described a curve along some bold ridge, or for a long space the white bannerets seemed hanging in the air, while these wingless birds were really sailing over a deep gully. I stood gazing till they were out of sight; it never occurred to me to shoot.

"When they were gone, I went to their trail, where they had appeared to be rising and falling over the same place. Here was one track, where was the next? I looked all around, and was surprised to see a blank for 15 feet. I went on—another blank—and again and again. The blanks increased to 18 feet, then to 20, and then to 25. Ye Gods! they do not run

[32]Mamm. Mex. Bd., p. 202.

at all, they *fly;* and once in a while, come down again to tap the hilltops with their dainty hoofs."

There is nothing more poetic in four-legged speed than the flight of the Bounding Burro-deer; and I have shown it to more than one man as a thing which none had ever seen before—which I alone had witnessed and discovered. But following the wonder and delight of the discovery, came a disappointment—this graceful flight, these light-foot bounds, are not so speedy as they seem, and not so easy as they look, are frightfully laborious indeed. By slow degrees, the conviction came that this Blacktail, winged as it seems, cannot run with the Whitetail. It has not the speed; it has not the endurance; the bounding is a thing of grace and beauty, but no more. That is, the Mule-deer has adopted a new gait—showy, but of inferior speed. So it seemed, so I believed it, as though this were not a contradiction, impossible in nature. This much is sure—that for all such strange things, there is a most excellent reason, and it is always rewarding to seek it out.

Why the Bounding?

Why, then, these mighty futile bounds? Thirteen years later, I learned. Riding the Little Missouri hills, in 1897, with a company of wolf-hunters, and followed by a pack of diverse Dogs—trailing Dogs, fighting Dogs, and greyhounds, fleetest of their race to overtake the flying foe—we came by chance on a prey we sought not—a Hill Deer mother with her twins. Great-eyed, great-eared, they stood at gaze, all three. We tried to turn our pack aside; but the greyhounds sighted game, and off like arrows shot they went, and the Hill Deer turned for flight. We did our best to call the hounds away; but who can turn a greyhound from a foe that runs? Away they sped, and the dun Deer sped away.

How the memories of my youth came back as I watched them bounding along the level bottomlands, bounding, bounding—oh, it was beautiful, it was glorious, but it was sad! For, notwithstanding all their wondrous powers, their winged heels, *they were losing time.* The greyhounds, far behind at first, were low, skimming like prairie hawks, were making three yards to the Wild Deer's two—were gaining, went faster yet, were winning, would surely win. In vain we tried to ride ahead to cut them off, to turn or call them back; their speed, their mad impetuosity, grew only faster and fiercer. In spite of every effort, we knew that in a few minutes we should see three defenceless Hill Deer mangled by our hounds.

On and on the chase. The little ones were suffering now, were weakening. It was a question of barely a quarter mile. Then we riders saw a

thing that touched our hearts—that poor, devoted mother, in despair, dropped back behind—deliberately it seemed—at least her young should have a chance, and my blood rushed hot. My hand sought the gun in reckless determination to stop those Dogs. Only twenty-five yards ahead the mother now, when all at once an inspiration came. The unseen prompter whispered wisdom; and the mother turned aside, made for the rugged piling hills so near, she—all three—soon reached their base and tapped with their toes, then rose in air to land some fifteen feet above, and tapped again—and tapped and tapped all three; and so they rose and sailed and soared. The greyhounds reached the rise and there were lost; their kingdom was the level plain; on the rugged hills they were helpless, baulked, and left behind. But the mother and her two went bounding, soaring like hill-hawks, and so they sailed away till hidden in the heights, and safely at peace.

That day I learned the meaning of the bounding. These are the Deer of the broken lands; theirs is the way of the uplands; this pace is their gift, their power, and their hold on life.

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LIFE LIII—THE COAST DEER

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The Coast Deer, Western Blacktail, True Blacktail, Cascade Deer, Sound Deer, Western Deer, Columbia Deer, or Blacktailed Fallow Deer

Odocoileus columbianus (Richardson)

(*Odocoileus*, see ante; L. *columbianus*, of Columbia River)

Cervus macrotis var. *columbiana* Richardson, 1829. Fauna Boreali-Americana, I, p. 257.

Odocoileus columbianus Merriam, 1898, Proc. Biol. Soc. Wash., XII, p. 100, April 30.

Type Locality—Mouth of the Columbia River, Oregon

French Canadian, *Le Daim fauve à queue noire.*
Siwash, *Mowitch.*
Indians of North California, *Uop* (Townsend).

The Coast Deer, like its congeners, the Whitetail and the Mule-deer, shows fully the characters of the genus *Odocoileus*, but is also well marked as a separate species. In size, it about equals the Whitetail. Its antlers are of the same type as those of the Mule-deer; its metatarsal gland is about 3 in. long; that is, twice as long as that of the Whitetail, and half as long as that of the Mule-deer; but it varies from 2 to 4 in., that is, it grades into that of the Mule-deer. Its tail gives the easiest diagnostic, for it is wholly white on the under surface, and wholly black, or very dark, on the upper.

Size. A typical ♂ specimen of Blacktail from the Olympic Mts., Wash., (No. 22763 Am. Mus. Nat. Hist.) dated Dec. 2, 1904, is as follows:

Length, 66¼ in. (1,680 mm.); tail, 9 in. (228 mm.), hind foot, 19 in. (482 mm.).

A ♀ (No. 22762 Am. Mus. Nat. Hist.) taken at the same time and place is:

Length, 63 in. (1,598 mm.); tail, 7½ in. (190 mm.); hind foot, 18 in. (457 mm.).

A 2-year-old that I collected in the High Sierra, near Lake Tahoe, 8 Sept., 1899, was as follows: Length, 53½ in. (1358 mm.); tail, 7 in. (177 mm.); hind foot, 17 in. (432 mm.).

Weight. This weighed 80½ lbs. "Very few of the bucks will weigh over 120 lbs. dressed. Does are not likely to run over 80 or 90 at best."[1]

Colour of the above. In December, *blue coat:* All above of a warm wood brown, which is the tip colour of each hair; finely peppered with blackish, which is the middle or next-the-tip colour of each hair, showing through. On the under parts, this body colour is shaded into white, with a strong dusky smudge the entire length of the breast bone.

On the legs, the body colour is shaded into clear sienna brown, which becomes paler on the inner sides.

On the forehead also, the body colour is darkened with a sienna tinge, and this dark area is bordered by a nearly black V between the eyes. On the cheeks, the brown is much paler; on the nose, it becomes grayish white. The chin is white, and there is a large white triangle on the throat. Across the snout above the naked part, is an irregular black band, and there is a blackish spot on each side of the lower jaw.

The buttocks and under side of the tail are clear white; the upper side of the tail is black, except the basal half which is the same colour as the body. The ears are gray with white linings, and have a white patch on the base behind, precisely as in the Mule-deer.

The hair edging the metatarsal and interdigital glands is, as in the mule-deer, of the same colour as that on the adjoining area.

Indeed, this whole description applies equally to a May 15th specimen of Mule-deer from Lower California, except that the Mule-deer's coat is of a pale gray instead of a rich brown; and of course, the tail is wholly different. The black shield on the Mule-deer's forehead is much darker, and the cheeks much lighter, than in the above specimens of Coast Deer.

But another buck Blacktail from the Olympics, shows an exact match of the Mule-deer pattern. Compared with a Whitetail from Colorado, the paleness or grayness of the last is striking, though their patterns are the same, even to the smudge on the breast. A specimen from Kupreanof Island, Alaska, is much darker and browner then a Mule-deer, but much less red than a Whitetail.

The Red or Summer Coat. The winter or blue coat has grown long, bleached and straggly by April; and in May, it is gradually displaced by the red or summer coat.

As I compare the summer coat (May 13) of a British Columbia ♂ with that of a fall (Nov. 8) specimen from Kupreanof Island, Alaska, I am impressed with their similarity. They are precisely alike in colour,

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[1] T. S. Van Dyke, The Deer Family, p. 254.

except that the May specimen is a shade darker, and glossier. The chief difference is in the depth of the fur. The hairs on the shoulder of the November specimen are $1\frac{3}{4}$ in. long, and on its hams around the disk, $2\frac{3}{8}$ in. long, while the corresponding hairs on the May specimen are but $\frac{3}{4}$ and $1\frac{7}{8}$ in. No doubt, this new coat turns much paler and yellower before summer is over.

In late August, this light summer suit, hardly to be called red in this case, is displaced by the short blue or winter coat.

There is no constant difference in colour between the sexes.

When seen alive in its native woods, the Blacktail gives the impression of a Deer with a dark brown coat somewhat tinged with olive; and when it moves off, its actions are exactly those of the Mule-deer—the stealthy glide through the thicket, and the high bouncing bounds as it hies away in full flight across an open space.

The tail, of course, is the definite label of the Deer tribes, the one reliable feature, and is distinctive enough, if we compare typical specimens. But it must be remembered that there is an intergradation of tails in southern California, through the Mule-deer, and in Arizona through the Crook's Deer, both of which may yet prove to be hybrids.

Colour freaks. While in Seattle, Wash., May 16, 1901, I was shown some interesting specimens of Coast Deer in the collection of C. C. Berg, the taxidermist. The Blacktail, or as it is there called the "Sound Deer," is abundant on Whidbey Id., in Puget Sound, and is there very prone to albinism. Berg showed me three specimens more or less albinistic and *very small*—not much over half the weight of those from the mainland. A pure white buck had been seen there lately. It seems that the isolation of these animals on the island is telling on them.

The freak list is completed in the following:

"Ranger Harley, of the Klamath Forest, reports the killing of a pure white Deer, and a pure black one, and adds that he has seen a third and greater wonder in the Deer line, one with white head, neck, legs and belly, and cream-coloured sides and back."[2]

Races

The following races are recognized:

columbianus Richardson, the typical form. T. l., mouth of Columbia River, Ore.

[2]Cal. F. & G., 1919, p. 207.

sitkensis Merriam, like *columbianus*, but smaller with smaller skull and teeth, and much shorter ears. "Base of tail above, fulvous like the back, instead of black." This last character seems to be unreliable. T. l., Sitka, Alaska.

scaphiotus Merriam, like *columbianus*, but ears very much longer and colours paler. T. l., Laguna Ranch, Gabilan Range, San Benito Co., Calif.

Hybrids

All the affinities of the Blacktail are with the Mule-deer. It is, indeed, a small specialized form of Mule-deer that has taken to life in the heavy timber of the rain-belt. And although typical specimens of each are widely different, it is significant that in the two regions where their ranges meet (namely the Cascade Mts. of Washington, and southern California) there appear intermediates, which are puzzling, but usually considered mere hybrids, as will be set forth later. In captivity, the Blacktail readily interbreeds with the Mule-deer, but Caton failed in many attempts to cross the Blacktail with the Whitetail. It will be remembered also that Richardson originally described the Blacktail as a variety of Mule-deer.

In the *Journal of Mammalogy* for Aug. 1921 (pp. 140–43), is an interesting illustrated article by Dr. H. H. T. Jackson, on a hybrid Deer which was brought to notice by James Henderson of Mabton, Wash., 2 years previously. This paper records that in a certain region on the eastern slope of the Cascade Mts., Wash., where their ranges overlap (see map) the Mule-deer (*Odocoileus hemionus*) and the Columbian Black-tailed Deer (*Odocoileus columbianus*) commonly hybridize. "It may be roughly outlined by the summit of the Cascade Mountains on the west; the region of Stampede (or Yakima) Pass and lakes Keeches and Keechelus on the north; a line drawn north and south through a point 6 miles east of Signal Peak, the Tieton Basin, and Frost Mountain on the east, and Mount Adams on the south."

Their respective ranges are very well defined, the Mule-deer seldom going to the summit of the divide, and never, apparently, beyond on the west slope. The Mule-deer go down the east side in winter and the Blacktail down the west side. Near the summit the Mule-deer are much more scarce than the Blacktails. The lack of mates of their own kind probably causes the buck Mule-deer to cross with the Blacktail does. Their offspring readily interbreed with either species and with each other.

The hybrids look like a Mule-deer with a Blacktail's tail.

Antlers

The correctly constructed antlers of a typical Blacktail buck are, like those of the Mule-deer, exactly "dichotomous," which is a more ponderous word than "bifurcated," or "double-forked," but means precisely the same thing; that is, they fork twice, and at each fork, divide into two equal parts. But most bucks do not adhere carefully to the rule; not many are quite typical; and those that are, attain it only during the 5th or 6th year—that is, in their prime. Many antler sets, in feeling their way to the perfect dichotomysm of the family ideals, pass through one stage in which they resemble those of the Whitetailed Deer; but at all other times, their close kinship to those of the Mule-deer is evident.

The successive growths are illustrated in the plate from Townsend's "Field Notes." After the 4th or 5th year, the abnormal style is as in Figure 6.

The largest Blacktail antlers mentioned in Rowland Ward's Records of Big Game, is that owned by Dr. H. M. Beck. It is given: Length of largest horn, 31 in.; girth, 7 in.; tip to tip, $34\frac{1}{4}$ in.; greatest spread outside, $44\frac{7}{8}$ in. (owner's measurements). Points apparently 10+10. (See sketch.)

The largest head measurement by Ward himself is: Length, 27 in.; girth, $5\frac{1}{4}$ in.; tip to tip, 13 in.; widest inside, $20\frac{3}{4}$ in.; points 5+5. Owner H. Venables Kyrke.

There is considerable variation in the shedding time of the Blacktail's antlers. It may occur at any time between the last week of January and the first week in March, with mid-February for most. The young bucks carry their spikes or forks longer than the prime bucks. The more vigorous the buck, the earlier he sheds; and a buck that is still wearing his antlers in March is in need of the doctor.

Lew Wilmot, writing from Okanagan Co., Washington, says that on March 7, 1896, he killed a big buck Blacktail whose horns were solid enough on his head to lift him by. (*Forest & Stream*, March 28, 1896.)

Townsend writes: "The wild bucks seen April 1 had new horns, in the velvet, about 3 inches long. In July, they appeared to have attained their full size, but the velvet did not begin to rub off until towards the last of August. In specimens killed September 10, there were bits of this covering still adhering to the white and, as yet, unpolished antlers. The antlers do not drop off until about the 1st of February, although there is considerable difference in this respect between the young and the old bucks, the former carrying their spikes much longer."[3]

[3]Field Notes, p. 167.

Freak Antlers

In Siskiyou County, Townsend saw a pair of antlers with the right one so palmated and flattened that it resembled a miniature moose-horn. A freak pair with Caribou palmations was shown me by W. H. Boren; they were taken in the coast range of Siskiyou, Calif.

A hunter in Shasta County, who had made a collection of freak antlers, showed Townsend a pair of slim-looking horns, which he was quite sure had adorned the head of a doe: a statement which was substantiated by one of this man's neighbours.

A most illuminating article on freak antlers appeared in *California Fish & Game*, July 24, 1916, pp. 119–23. It is from the pen of Frank C. Clark. I give a digest of it:

Freak antlers may be the result of any of 4 causes:

1st. *Violence* to the antlers themselves during their growth. These show as breaks healed up, like a broken limb, with a bony mass at the weld and the outer part usually at a wrong angle.

2d. *Food shortage or overabundance* during the growth. Thin Deer always grow slender, undeveloped antlers; Deer from a range where good food abounds, are often excessively developed.

3d. *Injury to the testicles*, which results in numberless strange phenomena unlike those produced in any other way; for the antlers are important sex characters.

If the buck be castrated when young, the antlers, if grown, are small and deformed.

If the animal be castrated when in the velvet, the antlers are never dropped, always remain in the velvet, and keep on slowly growing in odd shapes.

If castration be performed when the antlers are hard and perfect, they are never dropped at all.

It is not easy to say how castration may take place in a wild Deer. The testes are placed beyond the reach of ordinary injury. But there is the possibility of the animal descending on a sharp snag. Also, cold has been known to settle in the testicles, terminating in atrophy. There have been cases of Buffalo castrated by Wolves—which suggests several possibilities.

4th. Any severe *injury to the body or bones* of the animal, while the antlers were growing. Nearly all injured bucks develop deformed antlers, and nearly all bucks with deformed antlers show an old wound. Furthermore, the malformation in the antlers is almost always on the same side as the

injury, and in cases where both sides of the animal have sustained an injury, both antlers are usually deformed.

The following authentic cases are illustrations:

(a) Large, fat buck, killed Aug. 24, 1905. The antlers were practically mature, but still in the velvet. They were forked and about evenly balanced as to size, but one antler grew at right angles to the other instead of being parallel to it. Upon examination, it was found that this Deer had had three ribs broken several months before capture.

(b) Large buck with normal antler of three points on one side; on the other side a long, unbranched antler in the shape of letter S. This buck had previously been wounded in one of its hind legs.

(c) Large buck with normal "four-point" antler on one side and a long "spike" on the other. This kind of deformity is frequently reported by hunters. This buck had previously been severely injured.

(d) Very large old buck. Both antlers were extreme freaks. There were several prongs to each member. The antlers were very short. After growing almost as long as the ears, they grew inward and then down toward the head. They were very irregular in every respect. This Deer had previously been wounded in the back of the neck, in one fore leg, and in one hind leg.

(e) Large buck killed in autumn. A normal "three-point" antler was found on one side, and on the other side a forked antler which turned inward and downward toward the head. There was an offset in the bone of one hind leg of this Deer, and the fracture was on the same side as the crooked antler.

(f) Similar to (e). A normal antler of three prongs existed on one side, whereas the other turned inward and downward. This Deer had been shot through the front leg on the side of the deformity.

New light would be shed if we had full observations on females that grow horns; especially, species such as the Caribou whose females normally carry them. Probably barren does would show surprising headgear.[4]

History

On Monday, Nov. 4, 1805, on Diamond Island in the Columbia River below Quicksand River, Lewis & Clark[5] mention that they shot a Deer. At

[4]Since the foregoing section was written, I have come across an important article by John S. Gaskoin, F. L. S. (Proc. Zool. Soc. London, June 10, 1855, pp. 151–59), in which he gives much evidence to prove "*the fact that defective growth of one antler only, in the same buck, is not caused by an unhealthy state of kidney, of testicle, nor of any other organ, nor ailment of the animal.*" (His italics.)

[5]Vol. II, London edition, 1905, p. 248.

this time they were entering the range of this animal, and there can be little doubt that this was the first specimen taken by these explorers; that is, by any exact observers.

Later that day at the Killoot Village, they saw three Deer brought in.[6] Next day as they travelled they "saw some Deer on the island."[7] On Nov. 16th at Haley's Bay on Columbia River mouth "The hunters brought in two Deer."[8]

On Tuesday, Nov. 19, 1805, near Point Lewis in Columbia River mouth, and near the mouth of the Chinnook, the famous explorers write:

"At three miles we overtook the hunters, and breakfasted on a small Deer; which they had been fortunate enough to kill. This, like all those we have seen on this coast, are much darker than our common Deer. Their bodies too, are deeper, their legs shorter and their eyes larger. The branches of the horns are similar, but the upper part of the tail is black from the root to the end, and they do not leap, but jump like a Sheep frightened."[9]

This includes every notice in Lewis & Clark of the Coast Blacktail, from their first meeting with the species, until they recognized its characteristics, and gave the description which later was thus expanded:[10]

"The Deer are of three kinds: the common Red-deer, the Blacktailed Fallow Deer, and the Mule-deer.

. . . . . .

"2. The Blacktailed Fallow Deer are peculiar to this coast, and are a distinct species, partaking equally of the qualities of the Mule and the Common Deer. Their ears are longer, and their winter coat darker than those of the Common Deer. The receptacle of the eye more conspicuous, their legs shorter, their bodies thicker and larger. The tail is of the same length with that of the Common Deer, the hair on the under side white, and on its sides and top of a deep jetty black; the hams resemble in form and colour those of the Mule, which it likewise resembles in its gait. The Blacktailed Deer never runs at full speed, but bounds with every foot from the ground at the same time, like the Mule-deer. He sometimes inhabits the woodlands, but more often the prairies and open grounds. It may be generally said that he is of a size larger than the Common Deer, and less

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[6]Vol. II, London edition, 1905, p. 251.
[7]P. 252.
[8]P. 266.
[9]P. 269.
[10]P. 369.

than the Mule-deer. The flesh is seldom fat, and in flavour is far inferior to any other of the species."

On the strength of this discriminating description, Richardson, in 1829, named the species *columbianus*.[11]

Range

The Blacktail is strictly confined to the densely timbered, heavy rainfall region that comprises the Pacific and Sitkan Faunas, and forms the narrow coast belt from Sitka to San Diego, 150 miles wide and 2,000 miles long. It is, moreover, the only Deer found within this range, except perhaps, in Southern California, where the Mule-deer overlaps it, or to be more exact, dovetails into it; and in central western Oregon, where, according to Stanley G. Jewett, there is a small colony of Whitetails.[12] The narrowness and exactness of its boundaries, absolutely unique among our large mammals, are thus commented on by Judge Caton:

"Why it has never wandered beyond these bounds, it is hard to say. It has never even reached the base of the Rocky Mountains. . . . The mountain barriers could not restrain it; for it ranges high up on the Sierra Nevada, and is found at the eastern slope of that range. If the deserts at the south would deter it from an eastern migration, the valleys of the streams heading in the Rocky Mountains, and emptying into the Columbia River, invited it to follow their banks, and would have led it to the summit of the range, and to practicable passes.

. . . . . .

"In my grounds, they have endured the change of climate, food, and habit better than the Mule-deer, if there be any difference; so that they were not deterred from extending their range further eastward by the rigours of the season, any more than their larger neighbours. Still some conditions exist which I am unable to point out, which seem to confine them to that circumscribed country, beyond which it is impossible for them to pass. An imaginary line which becomes quite as impassable as a Chinese wall to an entire species of animals who have full physical power to traverse it, but do not, while all others pass it unhesitatingly, is certainly a curious and an interesting fact, well calculated to stimulate the naturalist to seek for the cause, which has hitherto eluded all inquiries."[13]

Perhaps the answer to this riddle is, that as soon as the Blacktail leaves

[11]Fauna-Boreali Americana, I, p. 257.

[12]Oregon Sportsman, Aug., 1914, p. 7.

[13]Ant. and Deer, pp. 98–99.

MAP V.—RANGES OF THE MUSKOX, MULE-DEER, AND COAST DEER OR BLACKTAIL

By E. T. Seton, with assistance of the Biological Survey

Range of the Muskox: northern Canada and Greenland. In the black areas, it is found to-day (1925). In the gray, it has been exterminated during the past century. The black spots are recent records.

Range of the Mule-deer: chiefly in the United States. In the untinted portion of Kansas, Nebraska, etc., it has been exterminated. South of San Francisco, it slightly overlaps the Coast Deer.

Range of Coast Deer or Blacktail: the black strip on the West Coast.

its rain-belt range, it reënters the environment of its ancestor, the Mule-deer, and is reabsorbed or transmuted back into that species by the subtle alchemy of its new surroundings.

Edmund Heller writes: "Deer were found fairly common on Admiralty, Baranof and Chichagof Islands. Admiralty and Chichagof mark their extreme northern range on the coast islands. They reach on the mainland about the same latitude. Their northward extension is apparently checked by the severity of the climate, the Deer at these latitudes succumbing to the cold in large numbers during severe winters."[14]

"Alexander Archipelago forms the northern limit of Deer in North America, the comparatively mild climate of the islands permitting their existence, though they could not survive on the neighbouring mainland. There is an apparent contradiction in the manner of their occurrence here. They are probably more abundant than at any other part of their range, and so conditions would seem to be favourable."[15]

The game-returns from the west seem to show that the Coast Blacktail, though greatly reduced in numbers, still occupies its ancient range, with the exception of a few highly cultivated regions, and the zone about each of the cities that have grown up on the Pacific slope.

Outlying Records

While in Denver, April 14, 1901, I was shown by Wm. R. McFadden a specimen of Coast Blacktail which he secured while hunting around Kootenai Lake in the Caribou Range, B. C., 60 miles N. W. of the Kootenai Lakes, about Oct. 28, 1892. He saw a band of 7 deer; 2 were bucks, 1 large and 1 smaller. He shot the large one, and was surprised to find it a *Coast Blacktail*, the only one he had ever heard of so far east. He followed the other for 5 miles in vain. The band was moving southwest.

This specimen I examined carefully, and sketched. It is in all respects a true Blacktail, except that it has the metatarsal gland 4 inches long; which raises a suspicion of hybridity. The tail is 7 inches long, without the hairs, which add 4 inches, and is of true *columbian* type.

Haunts

As the Mule-deer is the creature of the half open, dry and hilly country, and the Whitetail the proper inhabitant of the brush-grown river bottoms, so the Blacktail is the Deer of the dense, damp forests of the western slope.

[14] 1907. Alex. Exped., p. 247.

[15] Swarth, 1909, Alaska Exped., p. 114.

It may be high at one season and low down at another; but in each case, its immediate normal surroundings is heavy unbroken timber. The rare occasions when it is found in upland prairies, merely show that it knows the value of a sunlight tonic; and like all wise foresters, submits its body periodically to the healing rays.

Primitive Numbers

In primitive times, this Deer was extremely abundant throughout its range. All the early explorers agree that it was found in great numbers. Lewis and Clark do not say that it was plentiful, but the frequency with which they saw it, proves that. G. H. Von Langsdorff says: "It was very common" around San Francisco, 1803.[16]

In 1814, Alex. Henry, travelling on the Willamette, says: "We soon started a number of Chevreuils. . . . We continually had some in sight." On the next page, he adds that the Deer had paths in every direction, and must be very numerous.[17]

Bachman speaks of their being slaughtered by thousands in California during the early days of the gold-diggers.[18]

C. H. Townsend says it was found in abundance in North California in 1887,[19] and Fannin gives it as abundant in British Columbia, 1898.[20]

Dr. C. H. Merriam writes that (1898) the species was "abundant on Shasta and throughout the surrounding region. Even at Wagon Camp, which probably is visited by more hunting parties than any other part of the mountain, Deer were numerous, and their well-beaten trails were in constant use during our stay. At first the animals were commonest in the lower part of the Shasta fir forest, where for a long time they were not driven away even by the frequent shooting of our bird collectors. When we had been at Wagon Camp a week, they were still common within an eighth of a mile. Later, however, they became less numerous in the open forest, and more abundant in the dense chaparral of manzanita and buck-brush a little lower down. They were common also on Red Butte, and along all of the streams and canyons on the west, south, and southeast sides of the mountain. On the west side where water is scarce, numbers used to visit the pools in Cascade Gulch, northwest of Horse Camp. In Mud Creek Canyon their trails were so abundant as to form almost a meshwork. When we visited this canyon

[16]Voyages and Travels, 1814, II, p. 213.
[17]Journal, pp. 815–16. See Buffalo References.
[18]Q. N. A., 1851, III, p. 29.
[19]Field Notes, p. 165.
[20]Nat. Hist., B. C., p. 5.

first, July 22, Vernon Bailey saw 8 Deer. . . . They were so plentiful in a canyon about a mile east of Squaw Creek that I named the place Deer Canyon."[21]

T. S. Van Dyke writes in 1903: "I have been in the Coast Range of Oregon for three weeks at a time where I could see from 10 to 20 Deer a day, in merely riding through the woods."[22]

The last stronghold of the species in the United States seems to be Curry Co., Oregon, the westernmost of all west counties, and probably the wildest to-day. According to Alfred Powers, its Deer population in 1916 was estimated at 20,000;[23] that is, over 13 to the square mile. The fact that the human population, once larger, is now only 2,628, has a bearing on these pleasant figures.

Of the Sitka region, Swarth says:[24] "Probably in no other part of North America are Deer as abundant as on the islands off the coast of southeastern Alaska. . . . At every island visited . . . Deer were seen, without any effort on our part to hunt for them, and sign of various sorts was in evidence everywhere. . . .

"They were abundant on Coronation and Warren Islands, and some were seen at various points on Prince of Wales and Dall Islands, while on Heceta Island fresh sign was observed, though no Deer were seen during our brief stay. . . . The woods were everywhere intersected by a network of Deer trails, extending in all directions. The narrow channels between the islands are evidently no barriers to this animal, for Deer are found on every island of any size in the entire archipelago. To just what extent they continue to cross the wider arms of the sea, it is impossible to say, but they were occasionally seen swimming long distances, and also observed on small islets in the bays which must have been just casually visited."[25]

Yet this writer points out that Deer are almost unknown on the adjoining mainland, owing to the severity of the winters there.[26]

On Vancouver Island, the same author found them abundant, though much less so than 20 years before.[27]

The U. S. Department of Agriculture estimates that in 1922, there were in the National Forests of California 175,000 head of Deer, chiefly Black-

[21]N. A. F., 16, p. 101.
[22]Deer Family, p. 236.
[23]Forest & Stream, Aug., 1916, p. 1073.
[24]1909 Alaska Exped., p. 113.
[25]As above, p. 115.
[26]As above, p. 114.
[27]Birds & Mammals Vanc. Id., 1912, p. 85.

tail. The editor of *Forest & Stream* (Dec., 1924) is responsible for an estimate of 400 Blacktail on the 8 square miles of the Yosemite Valley, Nov., 1924; which shows a possible rate of population.

In the fall of 1925, there was reason to believe that the Deer in a certain Western county had contracted foot-and-mouth disease from some infected Cattle. It was of vital importance that at any cost this be stamped out. The Biological Survey and the Bureau of Animal Industry united in facing the unpleasant task. An army of expert hunters surrounded the affected county, and in about a month killed all the Deer.

It was a desperate remedy, but it succeeded. The terrible plague was stopped, and effectually stamped out; 2,249 of the Deer killed were diseased.

It was expected that 1,500 or 2,000 would be sacrificed. Imagine the surprise of the authorities when they found that this county of less than 1,500 square miles had contained *more than 23,000* Deer. No one had suspected so high a rate of population. It was merely good Deer country. As only part of the county was concerned, it showed that there had been over 20 head to the square mile.

The original range of the Blacktail covered 300,000 square miles. If we halve the above rate to cover poor country, we shall have a primitive population of 3,000,000 Blacktail.

The Great Slaughter

Bachman records that the gold miners of early California killed the Blacktail by thousands.[28] We must remember that the entire population then (1850) was under 100,000, and most were intent on getting gold. The Blacktail abounded, and there was no great diminution of their numbers in the '50's. But the rate of slaughter increased; and skin hunters appeared in droves to do what they have done to nearly every species of big game in America.

A. E. Doney tells thus of conditions in Siskiyou Co., Calif.:

"In the summer of 1873 my father took a party of six young men, our present sheriff, C. B. Howard, R. Walker, my three brothers and myself, on a hunting trip from Scott Valley to the meadows on Scott Mountain, 10 miles south of Callahan's Ranch. We were in camp six days, and during that time I saw from 20 to 60 Deer each day, largely does and fawns; on going up to the higher levels we found bucks. This was the report from all of the party.

. . . . . .

[28] Q. N. A., 1851, III, p. 29.

"In the summer of 1881, I went over the same ground alone on a hunt of three days, and saw no Deer; but during those three days the stench of the carcasses of Deer that had been killed by hide hunters was in evidence, and I was never out of it until I left the range.

. . . . . .

"I remember a trip from the valley with my father in 1878. The day we went up North Coffee Creek in Trinity County, I counted 158 Deer. The Deer paths to the numerous licks below, near the stream, were cut by the Deer from one to three feet deep along the hillsides.

. . . . . .

"The forwarding firm of Bush & Johnson, Redding, [report that] in 1880 [they] had handled 35,000 Deer hides from Siskiyou, Trinity, and Shasta counties. I later learned from men who had bought them, that the average price paid for Deer hides was fifty cents each. William Asher, whom I met in southern Oregon, told me that in 1888 he and a man named Bowen had killed Deer and shipped 3,000 hides to San Francisco."[29]

In a similar vein, Peter Klink writes, concerning the country at the headwaters of the Sacramento:

"Often in a day's hunt I have seen the carcasses of as many as six Deer lying about with the hides removed. This was the result of the hide hunter's work."[30]

The methods of these butchers are detailed by Burton L. Cunningham in *Recreation*, July, 1899, p. 37. He says that Deer are killed by the thousands in southern Oregon, and at all seasons of the year. S—— G——, a market-hunter, killed about 500 Deer from 1st of August to 1st of November. A score of others made similar records. L—— M—— and the P—— boys went onto the Umpqua fawning-grounds in June, 1897, and slaughtered the mothers for their hides, shipping out 1,500 skins and probably leaving 3,000 fawns to die of starvation; 30,000 to 40,000 Deer are killed each year by these market-hunters. What wonder that the game is disappearing!

The Halt and the New Day

This account fairly represents the condition of affairs in all parts of the West where game was abundant—reckless, brutal slaughter by a class of men that were as low as they could get. But their very shamelessness

[29] Cal. F. & G., July, 1916, pp. 123–24.

[30] As above, p. 124.

aroused the public. We hope and believe that they represented the low dip of the curve, which is also the high peak of destruction. Wise laws and a better spirit have already produced a change.

Within two years of the foregoing massacres, the operation of the new spirit and the new laws was manifest. Chas. W. Sawyer, of Gualala, Calif., writes:[31] "Since the present Deer law of California went into effect forbidding the killing of does and fawns at any time, and prohibiting the sale of venison, it certainly seems as though some portion of the State had become veritable Deer parks, so plentiful have these beautiful animals become."

G. O. Laws says that in 1915 Deer had increased 50 per cent. in Trinity Co., and other sections also report large increase.[32]

So also, Joseph G. O'Brien writes:[33] "I've been through the Blue Mountain country [of Calaveras County] every winter for twelve years, and I can say I never saw anything like the increase in the number of Deer here. Every day we see them. The boys counted 29 in one herd and 32 in another, and besides, we see numerous smaller herds. Yesterday I saw 20 without any effort on my part. This certainly speaks well for the enforcement of the game laws. Not over five years ago, one had to tramp a considerable distance to find a Deer, while a herd was quite a sight."

The official report[34] gives the number of Deer killed in California for the years 1914, 1915, and 1916 at 8,699; 8,343; 8,117 respectively.

There is good reason, however, for believing that the actual kill was far in advance of this, maybe double. The above quoted record (pub. Oct., 1915, p. 222) says that over 12,000 Deer were killed in California the previous year. The Mule-deer are included in this list, but their range is small and their numbers few. We are safe in believing that 10,000 Coast Blacktail were killed in California during 1914.

Will their numbers stand such a drain? Trinity Co., with about 3,000 miles of Deer country, heads the list with an official contribution of 735 Deer; about 1 to every 4 square miles. But no one who knows the ways of the woods, doubts that these official figures mean less than 1,500 actually killed by hunters, which again is doubled by beasts of prey. So that 3,000 Deer, or 1 to the square mile is the probable toll. Yet it seems that their numbers will stand this drain. Twenty per cent. per annum is accepted as the usual rate of increase among the Deer tribes. Therefore, these figures imply that there are 15,000 Blacktail now in Trinity Co., Calif. That this

[31] Recreation, April, 1899, p. 259.
[32] Cal. F. & G., Oct., 1915, p. 240.
[33] Cal. F. & G., July, 1917, p. 183.
[34] Cal. F. & G., Oct., 1917, p. 186.

is not too high a guess, is shown by the fact that in Curry Co., Oregon, the Deer were estimated at 13 to the square mile in 1916 (see *ante*).

A New Range for the Blacktail

It is a remarkable fact that the Blacktail is not native to Queen Charlotte Islands, though the Caribou is. The absence of Wolves and of deep snow at sea level, promised to make their island an ideal home for these Deer. Therefore Rev. Mr. H. A. Collinson took steps to introduce them, some years prior to 1900. Nine were released at Massett, on Graham Island, but so far it is not known that the experiment was a success.[35]

Food

One of the best life histories of the Blacktail is by J. D. Coffman.[36] His account of its food in northern California is thus:

"With the heavy snows on the higher ranges, the Deer descend to the lower elevations, and during the winter, feed on such bunch grass and browse as is available, utilizing moss, mistletoe and branches broken off by snow, where the more palatable forms of forage are unavailable. During this period of the year, the Deer travel in bands.

"As the snows melt away, they follow the snow line back to the higher ranges, and during May and June, scatter out through the mountains. During the spring, they feed on open glades, but after the middle of June, most of the Deer ascend to the higher slopes, feeding on tender shoots and grasses during the early summer, and almost exclusively on browse, such as hazel, oak and various species of ceanothus (blue brush, buck brush, wedge-leaf (chaparral), and white thorn), from early August until the acorns are ripe in the fall. Then mast forms a large proportion of their food within the oak country.

"In the fall, after the rains have come, Deer will also dig for roots and ground shoots, and feed extensively on the edible fruiting bodies of certain species of fungi that develop abundantly in the timber at that season."

T. S. Van Dyke says: "Like other Deer, the Blacktail rarely touches grass. He loves the tender leaves and twigs of the salal, huckleberry, and other shrubs that abound on the greater part of his range. . . .

"Springs and creeks are so common on most of this Deer's home that its movements are little affected by watering; while the browse is so succulent

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[35] W. H. Osgood, Nat. Hist. Queen Charlotte Ids., N. A. F. No. 21, 1901, p. 25.

[36] Cal. F. & G., Jan., 1920, pp. 15 and 16.

on a thousand shrubs that it often goes days or weeks without drinking at all."[37]

H. S. Swarth, in his Alaska Expedition of 1909 (p. 114), says of the Blacktail in the Sitka region:

"Early in April, the Deer were feeding largely on the tender shoots of the skunk cabbage, about the first green vegetation to appear. A little later they were seen eating the green grass along the stream margins and in the meadows, but during the summer they seemed to subsist largely on the foliage of bushes and shrubbery in the woods. They frequently came down to the beaches, usually in the mornings and evenings, where several were seen eating seaweed, possibly for the salt."

A picture of food conditions and climate on Prince of Wales Island in southeast Alaska, is thus graphically presented by E. W. Shaw.

"To understand the situation, it is necessary to state that from about Christmas time until early in March the snows are very deep, varying from 4 to 6 ft. This of course drives all Deer on both mainland and islands to the seashore, where at night they bed down within 50 yds. of the water. During the daytime they may be seen in great numbers along the beaches, feeding on 'kelp,' a kind of seaweed left unfrozen by the retreating tides. Three or four weeks on this diet will so weaken them that they fall a ready prey to both Wolves and hide-hunters.

. . . . . .

"It proved an easy place to still-hunt, having plenty of moss under foot to deaden the sound, and yet there seemed to be enough underbrush to give the game plenty of cover, should they be on the island. I was soon convinced that Deer were there, for I found unmistakable signs of their recent browsing on the skunk cabbage, which in this section grows with tropical luxuriance, and the Deer and Bear both feed upon it. I have seen this plant as tall as a man, and with leaves as broad as the length of one's arm. This is due to the extremely moist climate, the annual rainfall of Alaska being 14 feet."[38]

Thus the recorded fare-bill of this Deer seems to include every succulent unpoisonous thing that grows in the woods of its native range.

A more exact examination shows that, though it eats grass, marsh herbage, seaweed and toadstools, these are mere stopgaps in time of pinch. Its favourite and staple foods are browse, twigs, spring shoots of trees, and acorns. That is to say, it is like all its near kin, not a grazer but a

[37]Deer Family, pp. 232–33.

[38]Forest & Stream, Mar. 25, 1899, p. 227.

browser; it flourishes so long as it finds abundance of hardwood twigs in sap; and dwindles when it is driven to cattle-fodder and kelp.

Coffman says indeed: "It is noted after extremely cold and snowy winters that few Deer appear to die from the effects of the storms; Deer so dying being found late in the winter or in the early spring after they have commenced feeding on the open grass lands."[39]

Snow the Enemy

Among the natural enemies to this Deer, snow must be given first place. In a year of light snowfall or none, the Deer can find their food, even though they do much far travelling to get it; and can elude those beasts of prey that are a serious menace. But snow starves them to weakness, hampers their every movement, and leaves them at the mercy of a long list of merciless meat-eaters.

During the rut, which is in late autumn, the bucks are so reckless in expenditure of their bodily savings, so negligent even of eating, that the sleek fatlings of September are worn to their bony framework, as winter comes on them with its piling, blasting snow.

How hard hit these bankrupt spendthrifts are, we may judge by the pictures that Joseph Dixon gives of wild life on the islands of the sea in the Sitka region where the Blacktail still abounds.

"We saw," he says, "many carcasses of Deer that had died during the previous winter, which had been an exceptionally hard one on Deer, as the snow came early and stayed late. Most of the dead Deer that we saw were bucks. The greater mortality among bucks is due to the lean condition in which they are left after the rutting season. They become fat in July; and about the first of August, their horns are out of the velvet, at which time they begin fighting. Then the rutting season comes on, and they keep chasing about, getting poorer and poorer all the time. When winter comes, it finds them comparatively weak, very different from the sleek, fat condition of August. . . .

"Sometimes the bucks fight as late as Christmas, and when the hard spring months come they are so weak that they are only able to crawl off somewhere to die. A reliable hunter reported seeing in one day's walk the carcasses of about fifteen Deer that had died from starvation and exposure during the winter."[40]

J. W. Jameson of Dutch Flat, Calif., advocating feeding-stations for the Deer in snowtime, writes:

[39]Cal. F. & G., Jan., 1920, p. 16.

[40]1907 Alaska Exped., p. 247.

"It is safe to say that during our heavy winter of 1889–90, 2,000 or 3,000 Deer perished in the Sierras. If we could have had these feeding stations, I feel that at least one-half the number could have been saved."[41]

Wolves and Snow

Here is Swarth's account of the Deer on the Alexander Archipelago after a severe winter:

On these Islands "except in the mildest winters, large numbers succumb to cold and starvation, while every year the majority of the Deer finish the winter in a very enfeebled condition. Those seen early in April were emaciated to a degree, and too feeble and listless to make any great effort to get out of the way, while the woods were fairly strewn with carcasses. On the islands south of Frederick Sound, the Wolves also do much to reduce their numbers. At our first camp on Kupreanof Island, I counted twelve dead Deer on the beach within half a mile of camp, and probably half of these had been killed by Wolves. At other points, partly dismembered skeletons entangled in masses of windfall, and with the skin of the legs turned inside out, told of the tragedies enacted, even without the added suggestion from the bits of coarse black hair caught on the surrounding twigs."[42]

The Wolf is now absent from the southern part of the Blacktail range, and was at no time common in any part of California. But among the sea islands that trail down the map from Alaska, the Wolf is all too well known; and his evil work among the Blacktails is thus set forth by Gov. J. F. A. Strong, of Alaska: The decrease in the number of Deer on the islands of southeastern Alaska, is due in part to Wolves. The Rev. David Waggoner, for many years a missionary at Klawock, on Prince of Wales Island, wrote the Governor as follows:

"My observation in the last five years is that I have not seen a Deer track in the snow that was not followed by a Wolf track. Once I saw a fawn chased by a Wolf. The Wolf gave up the chase when it saw me. One native says that he has seen from one to four carcasses of Deer that had been killed by Wolves, every time he has hunted.

"Five years ago it was my lot to see Deer upon the beach every trip that I made along the west coast. One time I saw 40 Deer upon the beach in a distance of 8 miles. This was about 1909. Since 1911 I have only seen 3 Deer, all told, upon the beach of Prince of Wales. I travel on the west coast from 3,000 to 6,000 miles yearly.

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[41]Cal. F. & G., April, 1916, p. 112.

[42]1909 Alaska Exped., p. 114.

"When I came to the country in 1901, we could easily get a Deer anywhere we went in the woods. To-day there are only a few places where we can get Deer at all, and then only with difficulty, because they are so few. This is not due to killing by the inhabitants nor to the severe winters, though both have contributed to the scarcity. More Deer are killed by Wolves in one season than by people in several."[43]

Stanley G. Jewett, writes me, concerning the destruction of this Deer by the big Cascade Wolf (*gigas*): "On Canyon Creek, Santiam National Forest, Oregon, during the fall of 1921, I saw the carcasses of 5 Deer killed by these Wolves."[44]

From this it will be seen that the Wolves are the largest actual destroyers, and the snow is merely an overwhelming pitiless auxiliary that makes escape impossible.

The Coyotes and the Snow

But Wolves are scarce on most of the long, thin, Blacktail range; and the sum of testimony shows that the Coyote is the fiend they most should fear.

In 1911, John P. Babcock, of the California Fish & Game Commission, reported many Deer killed in the snow by Coyotes. Ben F. Addis, a trapper (of Confidence, Tuolumne Co.), says that in "January and February, 1911, he counted the carcasses of 17 different Deer along the main Stanislaus River beginning at the Russian Place and extending up it for a distance of 20 miles. With two companions he came upon a large buck struggling with 7 Wolves, with its throat torn open, but still alive. He believes that these Wolves, or Coyotes, destroy from 10 to 20 times as many Deer as the California Lion kill."[45]

"S. L. N. Ellis, the Deputy Fish and Game Commissioner, of California, says 'soft snow of eighteen inches depth or more will tend to render the Deer helpless; in fact, in snow 2 or 3 feet deep the Deer move very slowly, and would prove an easy prey for a pack of Coyotes.'"[46]

Stanley G. Jewett writes me (March 31, 1926): "During the month of March, when the snow is usually crusted, Coyotes kill a good many of these Deer. A few years ago, Harry Telford of Klamath Falls, Oregon, with one companion, found evidence of 39 Deer being killed by Coyotes."

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[43]Forest & Stream, Dec. 5, 1914, p. 717.
[44]Personal letter, March 31, 1926.
[45]Forest & Stream, June 10, 1911, p. 895.
[46]As above.

In 1919, H. C. Bryant pointed out that the most serious problem in saving the Deer was the apparent increase in Coyotes and Mountain Lions.[47]

Roy H. Blood, the hunter, writes that he has found many Deer killed by Coyotes in California and adds "a great many of the kills for which Lions are blamed should go to the Coyote."[48]

In fuller detail he says (p. 182), "I spoke to you about finding the carcasses of 8 Deer that had undoubtedly been killed by Coyotes. These kills were always in the deep snow, and one could visualize every move that was made. In each case the Deer was chased by not more than 2 animals—sometimes only one—and caught by another as he circled back over his trail. I have always read that these animals hamstring a Deer, but in so far as I could tell, these Deer were pulled down from in front by a nose hold; and when you take into consideration the size of these Coyotes it does not seem at all impossible. My largest was 62 inches long . . . but the average was better than 58 inches from tip to tip, and just that much bone and muscle.

"The one thing I couldn't understand about these killings was that they were all large Deer, and mostly bucks. It was some little time after the rutting season, and after the bucks had plenty of time to regain strength."

This experienced hunter finishes his most interesting account by intimating that the Coyote does not have everything his own way even in deep snow, for "two of the last Coyotes that I trapped had large unhealed gashes in their heads and along their sides that could have been made by horns only."

The Cougar and His Kill

When one realizes that the Cougar or Mountain Lion was abundant throughout the greater part—four fifths indeed—of the Blacktail range, and that venison was his favourite food, one is inclined to set the Lion at the head of the enemy list. But the Cougar has so nearly disappeared, while the Coyote has increased, that whatever the primitive conditions may have been, we must, I think, consider the latter the most destructive of the deer-devouring quadrupeds to-day.

Roy H. Blood writes from Madera, Calif., as follows on this subject:

"During my stay in there I saw but one Lion track, and though I followed for several miles I could not find where he had either attacked or molested any Deer. . . . J. T. Hogue told me that he had found a great many Deer killed by Lions in his time, but he admitted that he had

[47]Cal. F. & G., Oct., 1919, p. 206.

[48]Cal. F. & G., July, 1921, pp. 182-83.

seen no sign of a Lion at a great many of these carcasses and had simply taken it for granted that it was a Lion.

"When the Teafords were in there hunting Lion and Bear last winter they saw one Lion track—this Lion had come from Shake Flat across country to the Soda Springs on West Chiquito and straight through to Jackass—in a straight line and with never a stop, although he was passing through a country that literally swarmed with Deer of all kinds. Certainly, at that time of year he was going straight through and out of the Deer country, and though the boys followed him for two days he did not stop or make a kill of any kind."[49]

A thrilling picture of family life is seen in a hunting adventure at Lake Chelan. It is contributed by C. Greenwood of Chehalis, Wash. He says:

"Mountain Lions are not often seen in these mountains, but last November Daniel Devorce, who lives some 25 miles up the lake, encountered 4 in one band. They had been chasing a doe down a mountain, and he ran on to their tracks, which, being perfectly fresh, he followed. The unfortunate doe had dodged the Lions several times. Every spring she made was plainly shown by ploughed-up snow, and the sudden turning of the trail. The chase lasted some 200 yards, and the Lions secured their prey on the edge of a small gulch, into which pursuers and pursued rolled in a tangle of confusion. Hearing singular noises, the hunter approached and looked cautiously into the ravine. The 2 smallest Lions decamped at once, and one of the large ones ran a short distance and stopped. The largest of all refused to bolt, evidently meaning fight, until a bullet from a 38–40 Winchester pierced its head."[50]

Stanley G. Jewett writes me (March 31, 1926): "One of the most interesting cases of Cougar killing Blacktail Deer came to my notice a few years ago when A. G. Ames, then predatory animal hunter in the employ of the U. S. Biological Survey, found the skeletons of a large buck Blacktail and an adult Cougar side by side at the base of a hemlock tree near the headwaters of the Clackamas River in Oregon. Ames and Ben Patton, a forest ranger, told identically the same story, that the Cougar skeleton was lying in a heap at the base of a tree, the bark of which showed a considerable amount of old scratches, while the Deer skeleton lay 8 or 10 feet away. There was a perfectly round hole on the top of the Cougar's skull which hole fitted one of the prongs of the Deer's antlers perfectly. This would indicate that at least once the Deer was a match for the Cougar, even though the encounter resulted in the death of both."

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[49]Cal. F. & G., July, 1921, pp. 182–83.

[50]Recreation, June, 1899, p. 470.

Other Foes

The Bobcat and the Fox undoubtedly kill fawns during their helpless infancy. Eagles kill some, but probably very few, for the eagle cannot fly in the thickets that harbour the Deer.

George W. Giddings contributes a photograph to *California Fish & Game*[51] with this:

"The accompanying photograph shows a fawn which I saw killed by two bald eagles (*Haliæetus leucocephalus*) near Five Pines, Trinity County, California, a few years ago. The doe made a desperate fight, but the pair of eagles was too much for her. One of the eagles finally succeeded in carrying the fawn away in its talons and killing it. The fawn was photographed after it had been partly devoured by the eagles."

Diseases, Etc.

Nearly every living organism has more to fear from disease than from violence; that is, little enemies are worse than big ones. It is a shocking thought to some nature-lovers when they realize that wild animals have diseases and other troubles, much as we do; and although the Blacktail is an exceptionally hardy, happy species, it has its burdens to bear.

Swarth writes that the Deer on Kupreanof and Kuiu islands during April were "very thin and in poor condition, and quite indifferent to approach."[52] This, of course, was partly due at least to the winter famine already described.

Charles H. Townsend writes of the Deer around Shasta in 1887:

"Winter specimens were all infested with parasites, about an inch in length, which were found in clusters in the folds of the throat, almost every animal examined having considerable numbers of them. They appeared to be the larva of the bot-fly (*Oestrus?*).

"Many of these specimens were useless for mounting, the animals having spoiled their coats by rubbing against trees to rid themselves of wood ticks."[53]

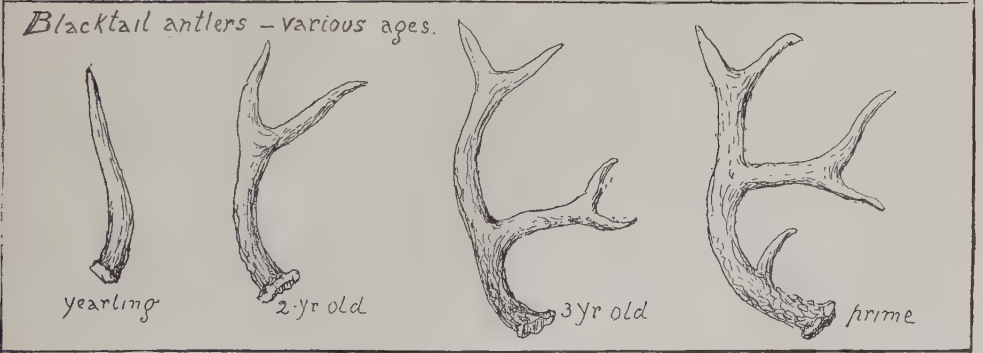
A female specimen I took at Tahoe, in September, was carrying swarms of ticks on its head.

Stanley G. Jewett writes me (March 31, 1926): "Under date of Sept. 1, 1925, Ed S. Hawker, Deputy State Game Warden at Albany, Linn County, Oregon, wrote me that he had shot a large Columbia Blacktail buck Deer,

[51] Oct., 1915, p. 239.

[52] 1909 Alaska Exped., p. 113.

[53] Field Notes, p. 166.



E. T. Seton

Plate LIX. – Blacktail compared with other Deer, etc.

the body of which had several sores somewhat resembling exaggerated boils. Upon my request, Mr. Hawker sent me a part of one of these animals, which was examined by Dr. Sam B. Foster, of the Tuberculosis Eradication Division of the U. S. Bureau of Animal Industry. His report is as follows: 'In respect to the pathological specimen which you left at this office, accompanied by the letter from Game Warden E. S. Hawker, under date of Sept. 1, 1925, I report to you that this specimen is a fibroma, a tumour of fibrous connective tissue.'"

"The California Fish & Game Commission has investigated (1911) the reported epidemic among Deer. Frank C. Clark, of the University of California, was sent to Trinity County, and spent considerable time in the district where dead Deer had been found. The disease had evidently run its course before he commenced his investigations. He travelled over a territory of 3 square miles in order to ascertain the extent of the deaths among the Deer, and in a superficial search found 30 dead ones. Several others were killed and carefully examined. All of the Deer found dead were greatly emaciated and boils or ulcers were located on the liver, kidneys and even on the heart. Bladder worms also were found, but it is doubted if these were in sufficient numbers to have caused death. The disease appears to have been restricted to a limited area, and to have disappeared as suddenly as it made its appearance, as but few diseased Deer are now to be found."[54]

As has already been been set forth in the section on *Numbers*, the Deer of one part of the West contracted foot-and-mouth disease from range Cattle. But fortunately the plague was promptly stamped out by energetic action on the part of the authorities, and has not since reappeared.

Deer Licks

As a tonic and cure for, at least, certain of their ills, the Deer repair to the health resorts known as "salt-licks." Townsend says that the Deer establish distinct trails leading to these licks and visit them regularly, sometimes in considerable numbers.[55]

The Deer licks of Trinity National Forest have always been favourite resorts for Deer. It is estimated that pot-hunters killed 10,000 Deer at the licks at the north fork of Trinity River, before, in 1911, it was happily declared a sanctuary for game, with a perpetual close season. H. C. Bryant, who visited the place in May, 1917, found that the Deer were, as is usual in

[54]Forest & Stream, Oct. 14, 1911, p. 585.

[55]Field Notes, p. 168.

refuges, responding amazingly to the opportunity. They were numerous and very tame. At one lick that was watched for about two hours, a dozen Deer came to indulge. The refuge is a great breeding ground and nursery for game. Not only is the place itself now repopulated, but the overflow is restocking the surrounding country.[56]

On other ranges, experiments are being made in the way of artificial salt-licks, to accommodate the increasing Deer herds; especially as some of the best licks are being monopolized by Cattle.

Accidents

A 2-year-old, taken at Lake Tahoe, had several scars, chiefly on the breast, showing where it had spiked itself while bounding blindly through the brush.

A tragic accident is recorded by Jay C. Bruce. He had followed the trail of a Coyote. It led to the carcass of a Deer which in picking mistletoe from a trunk, had slipped so that one foot was caught tightly wedged in the crotch between two trees. There, in spite of desperate struggles, it was held till it died. The leg was twisted to the shoulder, and the carcass lay belly up when found, showing how frantically it had fought for life.[57]

A. M. Fish, of Powers, Ore., tells of the extraordinary death of a big buck that in some unknown manner "had become entangled in the ranger telephone line of the Coos County Fire Patrol Association. . . . About six hundred feet of telephone line had been torn down and badly tangled by the animal in his unavailing efforts to gain liberty."[58]

Scatology

The dung pellets of this species cannot be distinguished from those of its near kinsmen. The black pellets of late summer, the brown woody pellets of winter, and the more or less confluent masses of springtime, are common to all of the species and doubtless to all of the family. Common also to the whole group are the frequent evacuations.

When Metchnikoff, in his "Prolongation of Life," demonstrated to the world that the lower colon was the breeding place of parasitic flora and fauna, which were probably responsible for man's shortened span of existence, he at least opened a new field of research.

In my "Life Histories," I maintained that no animal can have

[56]Cal. F. & G., July, 1918, pp. 21–25.
[57]Cal. F. & G., Oct., 1918, p. 202.
[58]Forest & Stream, Feb., 1926, p. 98.

a home—that is, a prepared, fixed, and permanent refuge from the weather, etc.—unless it has developed the rudiments of sanitation; which carries with it a limitation of the number of daily evacuations. This further implies a great increase in the size and storage capacity of the lower colon.

For example, none of the Deer tribe in America have a home. Normally, the smaller Deer evacuate every hour of their active life, which may mean 20 or more times a day. On the other hand, Wolves and Cats have a home, which they are careful not to defile with excretes. Judging by observations in the Zoo, these animals evacuate once, or at most twice, a day.

In the case of the Cats, we find that there are two habits prevailing among them. Those species which live in well-watered forests habitually drop their dung in water, as already noted in the Bobcat and the Cougar. Those which live in the arid, waterless country, bury their dung in the sand. In the Zoo, they are careful at least to deposit it in one corner of the cage, often going through the motions of burying it, though no loose material be available.

The Dogs keep their dens clear, and commonly show a disposition to scratch some earth onto their dung deposit. This they do with their hind feet. The two or three vigorous scratch-marks of the Wolf are often seen. They are shown in my illustration[59] as the signature of the Wolf.

Probably parasitic insects, external and internal, are the most dangerous enemies, next to man, that the large wild animals know. There are several kinds whose breeding ground and lurking place is the animal's dung. The care many of our Cats and Dogs manifest in sterilizing their dung is an instinctive act of sanitation.

If this be a proper application of Metchnikoff's theory, it should secure for the free-roving, oft-evacuating Deer, a vastly longer span of life than the den-loving animals, such as Wolves, Coons, etc. However, it does not appear to have worked out that way.[60]

Relation to Man

The earlier sections in this Life reveal a mass of damning and disgusting evidence against man, the arch-enemy of all wild life. But for our comfort, we must read on, and learn of the blessed change that has set in. The brutal destruction is stopped, and the saving of the Blacktail for the joy of later generations, is now an assured fact.

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[59]Vol. I, p. 384.

[60]See my paper "On the Study of Scatology," Journal of Mammalogy, Feb., 1925, pp. 47–49.

PLATE LXXII.—MOUNTAIN GOATS IN PHILADELPHIA ZOO

Photographs by E. T. Seton

PLATE LXXIII.—MOUNTAIN GOATS IN WASHINGTON ZOO, NOV. 4, 1925
Photographs by E. T. Seton

There are two classes of persons who are interested in wild life—the sportsmen and the sentimentalists. Of course, the creed of the former is, on the face of it, "to kill," and of the latter, at any price, anywhere, anyhow, all the time, "to save." And yet it is a curious fact that it has been the sportsmen who have originated and made effective nearly every movement and law that has operated to save our big game animals from extinction, and greatly to increase their numbers, even near settlements.

One of the great problems always is the adjustment of wild animals to agriculture. A very little damage is sufficient to raise a state-wide chorus of calamity howls among the rustic voters.

In one or two counties that I know of, this terrifying yell for blood was quelled by the sportsmen's clubs volunteering to pay the damages rather than repeal the protective laws. This was an unanswerable argument, and quite satisfactory to all parties; for very rarely indeed did a fair appraisal of the damage set it above five dollars.

Spray for Deer. In this same connection, an interesting item comes from H. C. Wagner of Mendocino County, Calif. His nine acres of young orchard had been nearly ruined by the Deer leaping the fence to browse on the young shoots. Under advice of John P. Fisher, the game expert of San Francisco, he sprayed the trees with a mixture of blood-meal in the ratio of 1 lb. of meal to 3 gallons of water. The depredations by Deer ceased immediately; and later, it was found equally effectual as a protection against Jackrabbits.[61] In regions of much rain, this must be often repeated, and, in any case, is less effectual than a high fence.

Venison. The venison of this Deer is, like that of its two cousins, excellent at the right season, if taken in the right way.

The bucks, during the rut, are not fit for human food—are, indeed, almost poisonous; the meat of a sick and starving winter or early spring animal is exactly what one might expect. So that persons who declare this venison far inferior to that of Mule-deer or Whitetail, are also informing us that they have been taking it "out of season" or "out of health."

His Powers Ashore and Afloat

Another characteristic that the Blacktail shares with the Mule-deer, is its peculiar bouncing action when in full flight. The Whitetail Deer leaps long and low. The Blacktail and the Mule-deer alone, of all swift things on legs, set off with all four feet close together as though "hogtied," rising very high and landing stiffly, to rise again in another wonderful high bound.

[61] Cal. F. & G., Oct., 1915, p. 241.

There is no doubt that the Whitetail fashion of running, like that of a Horse, is swifter and less tiring on a level course; but reference to the Mule-deer article shows the great advantage of the high bounding. It is for *climbing the hills* and overtopping the brush. So that among fallen rocks, in high chaparral or on steep hillsides, these Deer have nothing to fear in fair race from any quadruped native to their range. Indeed it guarantees to these two mountaineers a safety that would be impossible with any other gait.

A glimpse of its extraordinary swimming power is found in a record by Charles Sheldon during his trip to Admiralty Island, 1909: "In a heavy tide-rip *3 miles* off shore, two Deer, a buck and a doe, were seen swimming. They were headed across Frederick Sound for the mainland 9 miles distant. Evidently, a distance of 10 or more miles of intervening water is no obstacle for these Coast Deer."[62]

The Chase of the Blacktail

My own experience with Blacktails is limited to a single hunting trip in the High Sierra about Lake Tahoe in the September and October of 1899. Deer were scarce; we saw only three or four, and got only one. But I lost no opportunity of making notes and sketches.

In some early accounts, the Blacktail is pictured as simple-minded, and an easy prey for the pot-hunter. But there is abundance of evidence to show that this innocent creature has fully responded to the urge of new conditions and modern guns, and now needs little help to maintain himself against any but the most skilful of hunters; provided always that his homeland be not hid in drifts of the ten times accursed snow.

Of all my friends who know and hunt the Blacktail, perhaps T. S. Van Dyke of Los Angeles, has the happiest and rarest combination of hunter-craft to comprehend, and pen-craft to tell of it. From his Columbia Blacktail in "The Deer Family" I quote these vivid and accurate notes on its habits as a beast of the chase:

"The habits of the Blacktail are much the same as those of his family in general. Mainly a rover of the night, he prefers a good moon, though quite able to manage his legs in the deepest darkness. During the ten or twelve days when the moon is brightest, you may find plenty of fresh tracks in the morning, as soon as it is light enough to see. But the area you can traverse without seeing one of the Deer that made them is quite as astonishing as it is elsewhere. Having been induced by the moon to be on foot most

[62]Wilderness of N. Pac. Coast Ids., 1912, p. 216.

of the night, the game has a full stomach, all the exercise it needs, before daylight and has wandered off to some good place to lie down for the day. This early lying down, often causes more early rising in the evening, but as a rule even the evening hunting is very unsatisfactory when the moon is at or near the full" (pp. 233–4).

"Like other Deer, this child of suspicion so quickly learns the difference between the step of a Horse bearing a man, and the step of one without, that little can be gained by hunting on horseback. The knowledge seems almost intuitive; though, if belled Cattle are ranging the woods, Deer can be deceived by a bell on the Horse, and also by a bell on the man without a Horse. But this does not last long, and only the first inventors of the trick are likely to profit by it" (p. 235).

"The eyes of the Blacktail seem fully as keen as those of the Virginia Deer, but, like the Mule-deer, he is not so easily started by noise" (p. 237).

"On account of the nature of much of the ground you must make considerable noise, or you cannot move fast enough, and you will find many a Deer that must have heard you coming, but does not run without waiting to see what you are. These Deer hear you, and are generally calculating on outwitting you by hiding. But they often change their minds when they find you coming closer, and too often they cannot resist the temptation to stop a second, to see if it is really worth while to run at all. After much hunting they learn to act on the presumption of danger; but even then you occasionally meet a very great fool of a Deer, which will persist in staring at the new rifle of the rawest tenderfoot that ever, with hobnailed boots, smashed dead sticks it was more easy to step over.

. . . . . .

"One is apt to conclude that noise is of little account in hunting; but time will surely show that, for every Deer he sees when making a noise, two or three slip away before he can come within sight of them, some in full bound, whose tracks he may find when too late, others sneaking quietly off into the brush that would have remained in the open, had they not heard the step of man" (pp. 238–39).

His Elusiveness

"The most difficult trick of the Blacktail to circumvent is his hiding or skulking in brush, and letting you pass very close to him, well knowing you do not see him! All Deer seem to learn that in very dense cover this is generally safer than running. . . .

"But the Deer of the Pacific coast escape in this way more than Deer elsewhere. . . .

"In a little valley of a few acres in the wildest part of the Coast Range of Oregon we camped at noon, and two of our party went out to shoot some mountain quail which were running about in all directions in great numbers. One had a shotgun and the other a .22 rifle, with which they fired fully 30 shots, besides making a great amount of noise. For an hour before that, our party of four had been making the usual noise incidental to stopping to camp and get dinner. After dinner I set out for the woods with my rifle, passing within twenty feet of a clump of brush some fifty feet in diameter. The brush was thin, and stood alone well out in the valley, the rest of which was covered with grass. My two companions had been shooting all around it. After I was well past it, a large doe bounded out of it, in full sight of all of us, and vanished like an arrow in the dense timber on the side. As we were many a league beyond the last sign of man, fresh or old, it was not likely that that Deer had ever known much of the ways of man" (pp. 240–41).

"It took me 11 days where Deer were very plenty, 35 years ago [about 1870], just to get sight of the first Deer. It was more than 11 more before I was able to hit one. Yet I never enjoyed anything so much as the consciousness that the game was all around me, and that only my own stupidity was at fault" (pp. 248–49).

"In May and June and the early part of July, they move very little, and that generally by night. Not having to go to water to escape flies and mosquitoes, or for drink while the young leaves are tender and juicy, they remain most of the time quiet in the deep thickets, rocky glens and rugged gulches or windfalls, where you may generally make all the noise you wish without making one even run in such a way that you can see him. Even tracks may be so scarce that you may think they have all left the country (pp. 250–51).

His Cunning

"Like other Deer the Blacktail watches its back track after being started but I never could see that they watched it before being started. . . .

"The Blacktail often lies down on points that command a view of the back track, as well as a much larger area, but I cannot discover that it is done purposely, and on all its range it is probably safe enough to keep on the track where you can follow it at all" (pp. 252–53).

Reading these garnered experiences that give a peep into the subtle mind of the crafty, hunted Blacktail, and a gauge on the marvellous physical pow-

ers that are held at bidding of that mind, one realizes something of the higher charm and the hardships of the chase; and thus learns to believe that success can come only as the result of long, hard playing of the game.

One could easily list a hundred hunts that were failures before offering this that happened to be a success. It is related by Charles H. Sawyer as the climax of a series of disappointments, and is an excellent analysis and illustration of the Blacktail and the Blacktail hunt to-day.

It was on the Gualala, and after many blank days of pursuit. He had followed the trail of a buck into a dense thicket of bracken. Lying in this was a huge fallen redwood. He stole along this trunk, peering and listening. "The matted brakes," he proceeds, "made a view of the ground impossible, and I was certain that the jungle concealed a Deer. A faint rustle behind me caused me to turn, and I noticed a Chipmunk running up a dead tree. Suddenly, with a crash, a beautiful buck broke cover behind me almost under my feet. I had but one shot, and it was one of those times when one feels as though his rifle was part of his body; no fumbling, no hesitation, a quick steady shot, and my beautiful buck doubled up with a broken neck.

"An examination showed that he had made a bed against that log, under tangled brakes so dense, that he was invisible to me. I stood almost over him, and he must have watched until I turned," then sprang to escape.[63]

Tamability

The readiness of the Blacktail to respond to any gentle approach is illustrated in an incident related by Deputy J. L. Bundock (of the Cal. F. & G. Comm.).

In the November of 1917 Warden A. M. Weaver, of the State Redwood Park, found that the Deer would follow his trail to get the apple parings he dropped. This gave him the idea to bait them, and teach them to come at call. For bait he used sliced apples, various vegetables and barley in a wooden trough. After 7 months of patient effort, he scored a picturesque success. Now in early morning, or at 6 in the evening, he sends a ringing call through the great redwood groves. "Come Baa-aaby, Come baa-aa-by," and from all directions the wild Deer come fleetly racing to accept his offerings. They approach within a few yards of the Warden, but the sight of a stranger sets them bounding away.

He never calls without at least one coming; and the greatest number assembled at one time was 14.[64]

[63]Recreation, April, 1899, p. 261.

[64]Cal. F. & G., Oct., 1918, pp. 192–3.

The Uplands in Springtime

Like most of our Deer, the Blacktail is distinctly migratory throughout its range; and the same influences seem to have compelled and fixed the habit, as in the Mule-deer; namely, deep snow in winter, and plagues of flies in summer.

When spring comes, the melting of the snow and the hum of reviving mosquitoes, warn the Blacktail bands that they must leave the low sheltered forests that furnished them a winter range. Slowly drifting upward as the browning earth offers possibilities of food, they reach the highlands nearest their home, during late April or in May. In most regions, this movement takes them eastward. However, since the Shasta upland is ascended from all sides, there must of necessity be a northward migration, as well as a southward and westward, toward this famous summer resort.

The old bucks go higher than the young bucks or the does, and are usually found taking good care of their precious selves away up near timberline during the whole of the summer.

The Fawning Time

During May or June usually—rarely in July—the mother Deer sneaks off alone into some dead quiet place, shut in by walls of wood and leafage, screened by rocks and ferns, and hushed by moss, to face the crisis of her life alone. Only one little fawn arrives if it be a young mother and the first baby; but usually twins in the later years, and sometimes even three.

A ♀ that was kept in the Washington Zoo, gave birth to twins, ♂ and ♀, June 11, 1916; 1917, none; 1918, none; 1919, twins ♂ and ♀, born June 1. On July 10, 1920, she produced one fawn, a ♂; on June 14, 1921, she produced twins, ♂ and ♀; i. e., 3 sets of twins in 6 years.

At birth, the little ones are hidden by their mother in the dense ferns and lie like dead, near but not touching each other. According to the hunters, they give out no scent at this time, and there is at least this much support for the belief: their sweet little bodies have not yet developed the smell glands which give off the far-reaching odours that form part of the sex and signal system of every adult Deer; and because they do no travelling at all, they leave no telltale trail of foot scent to betray them to their foes.

The mother comes to suckle them several times a day, or some say only by night; and when not with them, mounts guard in the near neighbourhood. She is able and willing to fight certain of their foes, and others too strong, she can lead to some safe distance.

In spite of all her care, however, many a fawn is lost—the prey of

Coyote, Fox, Panther, Wolf, or eagle. There is much sad evidence that not more than half of them ever reach the proud maturity that is signalized by the changing of the spots—by the attainment of the even coat of gray in October. Two or even three fawns may have been born in that mountain dell; but rarely is the mother accompanied by more than one on her return to society in November.

When one meets with a family of 3 or 4 in late summer, it is worthy of notice. William S. Brown, of Alturas, Calif., was privileged to see such a group, and thus pleasantly records it:

"During the latter part of August, the writer ran across a doe with three fawns in the lava bed section of the Modoc National Forest. I was able to come quite close to the animals, which showed little signs of fear. I am quite positive that there were no other Deer in that immediate vicinity at that time, as I had been fighting fire close by, and had been all around the place where I saw the doe and fawns. I thought it unusual to see a doe with three fawns, especially as the little fellows ranged themselves alongside the doe as if they were perfectly at home, and belonged there. I stood looking at the three of them, and they at me, at a distance of not more than thirty feet, for about a minute, the old doe stamping her foot at me; then they trotted off leisurely into the brush."[65]

A remarkable case of fawns born in winter, is recorded by H. C. Bryant.[66] He says:

"P. H. Oyer, of Pacific Grove, reports that on December 28, 1915, he saw a doe Black-tailed Deer (*Odocoileus columbianus scaphiotus*), with two spotted fawns about two weeks old, in the sandhills on the Jack ranch, near Marina, Monterey County."

How long the fawns continue the life of hiding, is not definitely known; but analogy and fragments of testimony indicate that they do not follow the mother until they are over a month, or perhaps six weeks, old. No doubt it varies according to the vigour of the young. The stronger they are, the earlier they follow. It is likely also, that the change from hiding to following, is gradual; that is, the young may follow for an hour or two the first few days, and increase that mode of life as their strength increases. This probably means many nests or hiding places while they are learning to walk.

The beautiful spotted baby coats of the fawns are at their best while the little ones have to hide—are indeed a protective colouration; for they look exactly like spots of sunlight through broken foliage on a brown log.

[65]Cal. F. & G., Jan., 1920, p. 37.

[66]As above, April, 1916, p. 10.

But their beauty fades as the coat gets longer, and the young begin to run with the mother. In September, the spots are dull drab on a slightly brown ground. In October, when mother slips off her ragged, rusty, summer garb to appear in a slick underwear of clear dark gray, the little ones take the hint, and follow suit as nearly as they can, slipping off the polka dots to appear in the latest and neatest of their one-colour fall styles.

Mating and the Mad Moon

In our Woodcraft Calendar, November is known as the Mad Moon. For many wild things wrestling with a suppressed habit of migration, appear to go crazy then; and further, above all, that is the time when the Deer go mad in rut.

The mother Blacktail has had a happy time with her little ones all summer, drinking deep draughts of the twin goblets of life—the joy of maternity and the fear for her babies' safety; perhaps also of sorrow for their loss. But now it is November. The fawns are big, and can care for themselves. They are weaned, so the love magic of the feeding time is gone. Mother is fattening up and frisky, and now, in this spell of vigour, is the time ordained by Mother Nature for the founding of the next generation.

Already the bucks have felt the urge for nearly a month. Their necks have been swollen, their new antlers cleaned and sharp, their hearts and lusty bodies tingling and thrilling with the reproduction craze.

They have travelled fast and far in search of mates, but so far failed; for the other sex is more laggard than themselves in such matters. But the waxing of the Mad Moon adjusts these differences. Now the mother Blacktail, faithful, wholly devoted to her little ones—while needed—begins to feel the persistent chaperonage of her grown-up young as embarrassing as an eligible widow might find that of her well-grown children, if they tagged after her day and night, without a moment's respite.

Roy H. Blood of Madera, Calif., has given us a pretty picture of just such a situation. He writes:[67]

"There was a cave on the Logan side of the river where I thought there might be a Bear or so; and while I was sitting there one day waiting for a Dog to come up, so I could send him in, I saw an old doe and two fawns come down to drink on the other side of this river. It was the 26th of November and the Deer had just begun running, the first signs of this being on the 25th. This old doe led both fawns down and they started to drink. As soon as she saw they were busy at it, she started up the hill on a dead run, but they

[67]Cal. F. & G., July, 1921, p. 183.

heard her and caught up with her before she had gone 200 yards. She walked calmly back to the river with them again and set them to drinking again. This time she made her get-away, although the poor little devils ran and bleated around there for half an hour, until they finally lay down under a big oak and tried to forget it.

"I do not know that this is the way the doe gets away from her fawns at this time of the year, but this I did see; and I also know that after the season of mating is over, she comes back to her fawns again. During November and part of December these little devils were all alone, but at the time we left the hills—February 27—every doe had her fawns with her and seemed as loving to them as ever."

The Selfish Tyrant

The buck is perhaps the most selfish of all animals. When the female cannot minister to his pleasures, he treats her like an outcast or a defeated enemy. He will rob her of every choice bit of food, and stick his horns into her body, if she object, or is at all slow in getting out of his way. His principal object in life, is to take good care of his own precious carcass; and this he does with a whole-hearted devotion, tireless vigilance, and marvellous cunning, that can be given a good name or a bad, according to the side you are on.

During the heat of the day, the bucks lurk in shady nooks, high up in the hills, whence they have a good lookout as they lie. In the early mornings and late evenings, they descend to the open feeding grounds of the mountain meadows.

When pursued, they will sneak along quietly through the thickets and make for a stream, up the middle of which they will wade for perhaps a quarter of a mile, so as utterly to spoil the scent. This seems to be a recently learned habit, and is an exception to the species' general avoidance of water. For it is not at all an aquatic animal, in feeding or hiding. Although lakes abounding in lily-pads are found in all its region, I saw no sign of it ever entering them to feed, or even to wade or bathe; indeed, for no purpose excepting to drink.

It would be hard to imagine a more grossly self-indulgent life than that of these summer bucks, cavorting care-free in the high, safe mountains.

There is, however, this one unsordid element in it—they make pleasant platonic friendships among themselves. Oftentimes, two bucks will form a blood brotherhood, and help each other in every present problem. Even so late as September this continues, for Merriam writes in his 1898 Shasta

trip: "On September 18, I followed the tracks of two large bucks along the upper part of Panther Creek, and found where they had bedded close together under a low Shasta fir, on a steep slope, from which they could overlook the country below."[68]

There are some good reasons for believing these pairs to be twin brothers—fawns of the same mother, electing to carry on together the lives they began together on the same bright morning, under the same bunch of fern.

His antlers dropped off in midwinter; that is, during late January or February. As soon as the melting snow makes it possible, the buck moves up hill. The higher up the safer; so he goes to the top, i. e. the timber line.

In April, his new horns sprout out in big, soft, tender tumours, like brown fuzzy tomatoes, gorged with hot blood; and are so very sensitive, that he must avoid all brushwood and dense cover, living perforce in shelter of open timber and rocky glens. By August, the new horns are fully grown; and in early September, they are cleaned of velvet, polished and pointed. During October, the bucks go into training; for the only road to the garden of Venus is through the field of Mars.

As November approaches, the great change sets in. The bucks' necks begin to swell, and they are filled with the mating craze, hastened, many hunters believe, by a spell of cold weather. Now they go racing through the woods, in hopes of finding females like-minded with themselves; but are surely doomed to disappointment. Nature has a different way, a much harder way—and all for the good of the species.

The only thing they find is the field of battle. The females are rarely in the right mood till the last of the month, and perhaps we get a glimpse of nature's plan in these observations by Roy H. Blood:

"After the 20th of November," says he, "the large bucks started to come down from the high country, though the 'spikes' and 'forked-horns' had been running wild, a week previous to this. After that the ground was torn up in huge chunks on every hillside and opening, in the entire forest."[69]

This makes it seem that the spike-bucks and 2-year-olds were eager to offer their quite adequate services early in the month; but the prime bucks, having lived away up higher, were a week or two later in appearing, and it was nature's intention to delay the mating till these should arrive. When they do come, we know that the youngsters will disappear without second notice.

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[68]N. A. F., 16, 1899, pp. 101–02.

[69]Cal. F. & G., July, 1921, p. 184.

But the Blacktail is polygamous; there are not harems enough for all. The best should leave the most offspring; and there is an ancient and approved way to find out which is the best. The torn ears and chipped or broken antlers one so often sees, are records of these tryouts.

The combatants seldom die on the field of battle, for the horns are shields more often than spears; and the victor, that is, the one who is demonstrated heavier and stronger, is as ready to let the defeated run away, as the defeated is to do so.

But there is a doubly fatal termination which often takes place among creatures with branching weapons; that is, an antler-lock which results in the death of both champions. A case of this is recorded by Jay C. Bruce, the hunter.[70] He found the skulls with the antlers locked, April 26, 1919, east of Squaw Creek, Shasta Co., Calif., and writes:

"The arena for this buck struggle, covered an area of about 25 square feet in the corner of a meadow bordering on a small mountain lake. The bucks in their fury had trampled down the grass and vegetation, and had even in places ploughed up the ground with their hoofs. After a desperate struggle, either the animals were overcome by exhaustion, or famished from hunger and thirst. Winter came on, and Coyotes and other predatory animals prowling around in search of something to devour, made a delicious meal on their carcasses, leaving, however, the locked antlers in the condition in which I later found them."

While the rut lasts about a month in all parts of the range, it does not begin and end everywhere at the same time. J. D. Coffman says:

"For this region (the Trinity National Forest) the rutting season begins early in November, and ends about the middle of December, depending a great deal upon the altitude where the Deer happen to be feeding, the mating beginning several weeks earlier in the lower elevations than at the higher altitudes. On the lower lands within the watershed of the north fork of the Eel River, in the southwestern portion of the Forest, the rutting season begins about one month earlier than the general season stated above.

. . . . . .

"During the running season the bucks frequently fight each other, and many of the old ones have torn ears from their horned encounters with their rivals. The bucks at this time become thin, as a rule, and the meat is usually unfit for food, even though the buck may appear to be in good condition."[71]

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[70]Cal. F. & G., July, 1919, p. 161.

[71]Cal. F. & G., Jan., 1920, p. 15.

From mid-November, the Mad Moon, to mid-December of the Long Nights, is this season of love and war, in the north and in the high uplands. It may come earlier in warmer levels; but in any case, runs its course in four mad weeks. Then the craze is over, its purpose served; and a slow normalization sets in.

One reads of the days when knighthood was in flower, to learn that the three F's—fighting, feasting, and philandering—were the merry triad of their heyday, inextricably and joyously associated. Our bucks in rut exactly recall these childishly simple, fighting folk, in their reckless devotion to their avowed pursuits, but with the amazing exception of the feasting.

The merry swankers of King Arthur's day did indeed take food in mighty meals, perforce to meet the drain; but our Blacktail bucks, with even madder devotion, waste little time in eating. So when the craze is over they are a sorry bunch; worn out in body and estate, poor broken wrecks with all illusions gone. And the merry widows all about, now no longer interesting, do well to keep away from their recent tilting knights, unless they want a puncture between their tender ribs.

After the Rut

Now she that set the pace wakens up, like a rustic dame, who, under some hallucinating spell, has been on a red-cup trip to town. Now she remembers that she has a family of her own, out somewhere in the chaparral. And the great big all-pervading influence, that we sometimes call Mother Carey, says, "Now calm yourself and settle down; the next year's brood is all arranged for. Your present job is to mind your health, and teach your last year's fawns such little wisdom as is yours."

Throughout the winter now, the reunited family—mother and half-grown fawns—continue together in something like ideal relations. The separation during the Mad Moon, has at least definitely established the fact that the young are weaned, and now the mothers avail themselves of the abundant opportunity to get fat before the winter comes.

On the same levels now as their lords, but in separate groups, they continue, until the ever-deepening by-product of January the Snow Moon, forces them down to the lower country. Here, in all the wooded valleys of their range, especially those that front on the western sea, they find new foods and new dangers, but less snow.

But the bucks who have gone the pace, have a harder problem. If I were aiming at pretty pictures, I should leave them out of further consideration. Their every impulse and intent seems changed. The sight of a

female is unwelcome; and the big fellows go off with their he-pals, and resume a brotherhood life, with absolute repulsion for the eternal feminine.

Of course, there are moralists of the Doctor Watts type who say harsh things about these new-made misogynists, these worn-out *débauchés* in their black reaction, now putting up a virtuous front for the poorest of reasons known. But it is all in nature's hands and plan. These things are in accord with laws unwritten, but inexorable; so their purpose is served. The lusty love-mad bands in the tourney groves disintegrate; and the enfeebled bucks slink into far quiet places, to recover if it may be, before the snow and trial time proceed to strike the under-gifted from the list.

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The Common Prongbuck, Prong-horn, Antelope or Prong-horned Antelope of America, Cabrit or Cabrie, Pied Goat of the Plains

Antilocapra americana (Ord)

(*Antilocapra*, name compounded by Ord, in 1818, out of L. *Antilope*, an Antelope, and *capra*, a Goat; *americana*, of America)

Antelope americana Ord, 1815, Guthrie's Geogr., 2d Am. ed., II, p. 292 (descr. on p. 308).
Antilocapra americana Ord, 1818, Journ. de Phys., LXXXVII, p. 149.

Type Locality—On the plains and the highlands of the Missouri

French Canadian, *le Cabrit*
Cree, *Ah-pi-chee Ah-tik* (small Caribou)
Yankton Sioux, *Tah-chah Chis-teeh-ah* (small Deer)
Ogallala Sioux, *Tah-heen-cha Sahla* (little pale Deer)
Mexican, *Berendo*

The Family *Antilocapridæ* is unique. It combines peculiarities of the Giraffes, the Goats, the Antelope, and the Deer. It consists of a single genus, *Antilocapra* (Ord, 1818); and this consists of one species, found only in North America. Therefore the characteristics of the animal are the characteristics of the genus and of the Family.

The American Antelope is a ruminant, which, like the Giraffe, has two hoofs on each foot; like the Goat, it has a gall-bladder and a system of smell-glands; like the Deer, it has 4 teats and a coat of hair, with an undercoat of wool; like the Goat, it has hollow horns on a bony core; yet, as in the Deer, these horns are branched, and are shed each year.

Size. Total length of ♂, 52 in. (1,320 mm.); tail, 3½ in. (89 mm.); hind foot, 17 in. (432 mm.). A fair-sized buck stands 36 in. (914 mm.) at the shoulder, the top of the head rising a foot higher. A 4-months-old buck which I took in Jackson Hole in Oct., 1898, stood 28 in. at the shoulder. The ♀ is about 10 per cent. less.

Weight. An ordinary buck weighs about 100 lbs. The above-mentioned 4-months buck weighed 60 lbs. A large one, killed by E. S. Dodge,

of Oracle, Ariz., weighed 125 lbs.[1] Mearns gives an adult buck at 112 lbs.[2] The ♀s are usually smaller and lighter, but Mearns gives an adult with 2 unborn young at 109 lbs. after bleeding.[3]

In Nelson's Monograph, he quotes E. R. Sans, referring to the kids, as follows: "We shipped some of them on the 9th of September, when their average weight was 42 pounds, at $3\frac{1}{2}$ months of age. They ranged in weight from about 35 up to 50 pounds each."[4]

Colour. The colour of the adult *male* Antelope is a rich tan, varied with pure white patches, as shown in the Plate; that is to say, the sides of face, nape of neck, base of ears, two bars on throat, breast, belly, rump, and inside of limbs are white. The upper part of the muzzle, the patch under each ear, the eyes, horns, hoofs, and sometimes the mane, are black.

The *female* is similar in colour, but the black areas are less, and those under the ears are often lacking. Also, I have seen more than one big buck without the black patches under the ear. Occasionally, specimens are seen with a distortion of the usual pattern on the throat, as though the stencil had been jarred when the work was half done.

The young are at first grayish brown, darkening on the face, paling on the rump, and with faint suggestions of the adult colours and pattern; but never are spotted as in the Deer Family. They assume the adult colours toward the end of their first summer.

Races

The following races have been described:

americana Ord, the typical form. T. l., "Plains and highlands of the Missouri."

mexicana Merriam, a pale race. T. l., Sierra en Media, Chihuahua, Mex.

peninsularis Nelson, a dark race, much like *americana*, but with darker face-marking, a dark band joining tail and back, and with short, roughened horns; teeth heaviest of the three. T. l., 45 miles south of Calmalli, Lower Calif.

History

In that eventful *anno domini* 1535, when Jacques Cartier ascended the St. Lawrence to be the white discoverer of Hochelaga (Montreal), Francisco

[1]Recreation, Oct., 1898, p. 307.
[2]Mamm. Mex. Bd., p. 226.
[3]As above.
[4]Pronghorn, p. 20.

Vasquez de Coronado landed in Mexico, and became a pioneer and an empire-builder of world-wide fame. Five years later, he set forth on his memorable march northward as far as Kansas, discovering and possessing in the name of the Cross and the King. Thus, he may have been the first white man to see the Antelope.

Yet this ruthless old pirate was so poor an observer of animals that we find in the various accounts of his march nothing more than these rather doubtful mentions of the Antelope that he certainly saw in hundreds of thousands on probably every day of that historic march, once he had gone north of lat. 30°. Casteñada, his recorder, writes:

"Between Suya and Chichilticalli [Casa Grande, Ariz.] there are many Sheep and Mountain Goats with very large bodies and horns. Some Spaniards declare that they have seen flocks of more than a hundred together, which ran so fast that they disappeared very quickly."[5] The combination of the words "Goat," "great speed," and "plains," certainly, in that region, indicates Antelope.

Later, July, 1540, the expedition reached the Buffalo Plains of Cibola in central New Mexico. The Buffalo he calls "cows" and Casteñada continues:

"There are very great numbers of Wolves on these plains, which go around with the Cows [Buffalo]; they have white skins. The Deer are pied with white."[6] There are Deer in the region, but they are not pied with white, and are much less conspicuous than the Antelope. The association of these 'Deer' with the Cows (Buffalo) is significant.

Coronado himself, writing to Mendoza, of the Zuni or Cibola pueblos, says: "There are also wild Goats, whose heads I have seen."[7] Perhaps the best of these records is found in Mendoza's letter to the King, April 17, 1540, concerning Coronado's trip. He says: "There is a great abundance of wild Goats, the colour of bay Horses."[8]

There is, however, another claimant for the honours of discoverer, and on that same year. Nelson, in his recent monograph on the Antelope, writes:

"The first record of the Pronghorned Antelope having been seen by Europeans was published in 1723 in Torquemada's "Monarquia Indiana" (Vol. I, Book 5, pp. 611–12), in which is described a great hunt made in honour of the viceroy, Antonio Mendoza, in 1540, at a place in the extreme

[5]Coronado Exped., p. 516.
[6]As above, p. 528.
[7]As above, pp. 559–60.
[8]As above, p. 550.

southwestern part of the State of Hidalgo and adjoining parts of the State of Mexico. The plain on which the hunt occurred has been known from that day to the present as the Llano del Cazadero in commemoration of this event. The station of Cazadero, on the main line of the Mexican Central Railroad, marks this vicinity.

"The hunt took the form of a great drive of game by the Indians, during which, the author states, 600 Deer were killed, among which were large Stags 'and those which they call Verrendos.' He states that the Verrendos did not occur in Spain, and that 'they not only ran but flew,' thus indicating that the remarkable speed of these animals attracted the attention of the first European observers."[9]

But Coronado and his contemporaries, when they discovered the Antelope, were too busy adding to the spiritual kingdom of their masters, in consideration of the material plunder thereof, to bestow a second thought on this wonderful wild thing. It remained for Lewis and Clark,[10] 270 years later, to give the world detailed information about the Pronghorn of the Plains.

Historical Names

There is much of history in its names. From Mexico to the Saskatchewan, it has been called "Goat." Yet, as we have already seen, Mendoza in 1540 called them "Verrendos." Charles F. Lummis writes me: "Herrera mentions them under their proper name of 'Berrendos.'[11] I do not recall any mention of them in Gomara." In Mexico, to-day they are universally called "Berendos."

The word "Cabrit" or "Cabrie" used by the half-breeds of the Northwest may be, as Richardson suggests,[12] a Basque corruption of the Spanish *cabra*, a Goat.

The Century Dictionary, without hesitancy, derives it from the Spanish *cabrito*, a kid—old French *cabrit*, a kid.

The fact that Lewis and Clark, the English fur-traders and the earliest Spanish explorers, call it "Goat" helps this idea. But Doctor Coues thinks Cabra, Cabbrie, Caberey, etc., may be a native word adapted. He says "it occurs in early annals of the Northwest under circumstances which lead me to believe it an entirely different word [from Latin *capra*] of Indian origin."[13]

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[9]Pronghorn, pp. 1–3.
[10]Journal, Biddle edition, 1814, I, p. 122 *et seq.*
[11]Decade, II, p. 288, 1601.
[12]F. B. A., I, 1829, p. 262.
[13]Henry's Journ., I, 1897, p. 191.

The names *Le Squenoton* and *Squinaton*, recorded by Dobbs and his anonymous predecessor,[14] probably do not belong to this species.

In 1651, Hernandez described[15] this animal. He calls it *Teuthlalmaçame* or *Temamaçame;* evidently these were the native Aztec names, and in the same paragraph he uses the name "Berendos."

Range in General and in Manitoba

The map shows the Antelope to be by choice a creature of the high and open plains; although in California and Texas, it was originally found down nearly to sea level. Its preference is the flat country; yet it is often found on rolling or hilly lands, and occasionally in small parks or forest openings; its prime requisite being that its feet rest on hard, dry ground.

Its primitive range covered about 2,000,000 square miles.

Formerly the Antelope abounded on the high prairies of southwestern Manitoba, as attested by several old records:

In the fall of 1801, Alex. Henry built a trading post at the mouth of the Pembina River, near the present St. Vincent. Here he lived, traded, and scribbled for several years. His journal shows that Buffalo were abundant about the fort. The only mention he makes of Antelope is this.[16]

"Nov. 15. An Indian brought me a large Cabbri which had four inches of fat on the rump."

In 1806, Henry was travelling W. S. W., from Portage la Prairie, Manitoba, through the Brandon Hills, and says:[17]

"July 14. From the summits of these high barren hills we had delightful views. In some low spots were clusters of poplars; to the north we could see the Assiniboine, north of which we could trace the course of Rapid River [Little Saskatchewan], which comes from Fort Dauphin Mountain [Riding Mountain]. Herds of Cabbrie or Jumping Deer were always in sight."

He continued his journey S. S. W. across the Plains of the Souris into what is now Dakota, finding abundance of Buffalo; and records next day from near the Boundary, at a point 14 miles south of Boss Hill, on the west bank of the Souris, close to Butte de Sable:[18] "Cabrie were in sight almost every moment, but so shy that we could not get a shot."

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[14]Quoted by Richardson, F. B. A., I, p. 262.
[15]Nov. Hist., pp. 324–25.
[16]Journal, p. 191.
[17]As above, p. 305.
[18]As above, p. 306.

The following day he wrote:[19]

"July 16. We saw numbers of Cabbrie of two different kinds, some [the bucks] almost as large as fallow Deer and others [the does] much smaller, red and white spotted; the latter had young, and did not appear so shy as those we had seen before. The young ones, sighting us, would run up to us within a few yards, while the dams would come on behind them with more caution, until their curiosity was satisfied."

These are all the very early mentions I can find of this animal in Manitoba.

Antelope were never found along the lower Red River, were rare even on the White Horse Plain, where, however, Captain John Schott of Athabaska Landing tells me he killed two in the spring of 1855. He was then a boy of 14. This is the only evidence I can find of Antelope anywhere near Winnipeg. In 1852 Schott was with a number of Buffalo hunters on the Big Plain, near the site of Carberry, and there saw several bands of Antelope. But nowhere north of the Assiniboine were they plentiful as on the high prairies west of Pembina Mountain.

In 1858, Professor H. Y. Hind, travelling from the United States Boundary on the west bank of the Souris, due north across the Plains of the Pipestone, records[20] for a point apparently 10 or 12 miles north of the Boundary:

"*July 4.* We saw some herds of Cabri, and McKay succeeded in killing a female." But his narrative shows that they were very rare in the region.

In 1874, Dr. E. Coues saw "a few Antelopes" along the Souris River, near the Boundary.[21]

J. T. Brondgeest of Whitewater, Man., tells me that he first came to Whitewater in 1879, and settled down in the fall of 1880; and that in those days, there were plenty of Antelope about. But the last he saw was killed by his father in 1881.

In 1882, when I traversed that whole region, I neither saw nor heard of any Antelope, nor can I learn that they have ever been seen since.

Haunts

The Antelope is essentially a creature of the open country, a product of the wide and arid or semi-arid Plains or adjacent foothills. Yet it was found in the Parks or treeless plains high in the mountains, even when to reach these, it had perforce to journey through woods and rugged passes.

[19]Journal, pp. 310–11.

[20]Assin. & Sask. Expl. Exped., 1859, p. 46.

[21]Birds Dak. & Mont., July 29, 1878, Bull. U. S. Geol. Surv., No. 3, Vol. IV, p. 547.

In summer, it adhered to vast open spaces; but winter blizzards brought a change of mind, and the pleasant shelter of the woods and brakes was often sought by the white dappled herds.

Nelson says: "As winter approached, they began to gather in bands, sometimes containing thousands of individuals, and to seek favourable feeding grounds for the winter.

"A band of more than 500 frequented a broken and open pinyon and cedar forest in the part of eastern Arizona where the writer lived in the early '80's. In summer, they broke up and scattered over the more open plains in the adjacent parts of New Mexico and northern Arizona. Numbers of them continued to reside through the year among the pinyon and cedar forests; but the bulk of the band went out on the grassy plains.

"In winter, they were very fond of gathering in the pinyon and cedar forests, where they were sheltered from the cold storms which made the open plains places of discomfort. When within these scrubby sheltering forests, they were especially liable to become victims of predatory animals and hunters.

"Near the base of the Sandia Mountains, in New Mexico, the writer knew of hunters trailing bands of Antelope among the pinyons during long-continued snowstorms, and killing many of them one after the other. . . .

"During the '80's, the increase in the Cattle business was so great in northern Arizona that the Antelope learned many new habits. Among others was that of following range Cattle through a belt of heavy pine forest up to an elevated grassy plateau of about 8,000 feet altitude, lying on the east front of the White Mountains, about the headwaters of the Black, Blue, and Colorado rivers. There, on a wide, rolling open plain, they passed the summer, coming out, on the approach of winter, in company with the Cattle. This change was comparable to that which caused the Elk, once a habitant of the foothills and adjacent plains, to become an animal of the higher elevations. During this period, Antelope became frequenters of the open, grass-grown, yellow-pine forests of the mountain areas not only in various parts of the United States, but also in the Sierra Madre of Chihuahua, Mexico."[22]

Home Range

My own experience with this animal has been chiefly on the Plains of the Canadian River and in western Wyoming. I was there much struck by the smallness of the home locality that seemed to satisfy each band. A level stretch of open prairie two miles across seemed ample range for a herd

[22]Pronghorn, p. 8.

of 20 throughout a whole season. If there was water on it, they seemed satisfied to stay indefinitely. All the records I can find are of similar import. Thus:

Dr. E. L. Munson, U. S. Army, says:[23] "For some weeks, a band of several hundred were in a large pasture 4 miles square, several miles from Havre, Montana."

Dr. C. A. Canfield, of California, says:[24] "Any particular band of Antelopes does not leave the locality where they grow up, and never range more than a few miles in different directions."

W. N. Byers, of Denver, Colo., tells me that for several years in Middle Park, Colo., he used to see one particularly large buck Antelope near the road, within a mile of the same place.

It is a common remark that the Antelope, when hunted, runs in a circle. A little reflection will show that this is true of all animals, and that the circle is always around the region that the creature knows, namely, its own home locality; in this case but 3 or 4 miles across.

Commenting on this, Enos A. Mills says that the home range "is rarely more than 6 or 8 miles in diameter."[25]

During summer, the bands are scattered, but the range of the individual is even smaller. I have seen an old Antelope that made her summer home on the flat top of a butte that was less than 200 acres in extent.

The males seem to be less local at this time than the females; and, like bull Moose, commonly wander in twos. It is quite likely that these two are twin brothers.

Migration

But all this permanent residence of one spot seems to be in regions where the winter is mild and the snow light.

Speaking of the species in Colorado, Mills says: "Antelope in the plains appear to live in the same territory the year round. Many times in winter I have been out on the plains and found a flock feeding where I had seen it in summer. But one snowy time they were gone. I found them about 15 miles to the west, where either less snow had fallen or the wind had partly swept it away. The Antelope were in good condition."[26]

In the northern part of the range, a different habit prevails. At the first heavy snow, the Antelope of the Upper Jackson Hole travel 150 miles southward to the Red Desert. Those on the prairies of the Saskatchewan

[23]Forest & Stream, Feb. 27, 1897, p. 164.
[24]Caton, Ant. & Deer, p. 43.
[25]Watched, p. 184.
[26]Watched, pp. 166–67.

move into the coulees and brakes, 100 miles southward and westward. Those of the Plains near the Rockies go toward the foothills, and those on the open country about the Black Hills flock thither from all points of the compass.

Edwin Carter tells me that the Antelope used to winter in vast numbers about Colorado Springs, and were common in the surrounding country all the rest of the year.

As noted later, Major James B. Pond told me that during a blizzard in the winter of 1868–69, he saw the Antelope crowded in every sheltered valley along the railway line from Cheyenne to Denver.

At Medicine Hat, Alberta, I was informed that a snowstorm in winter would concentrate the Antelope in coulees and places of shelter. But these are temporary congregations, and, according to Dr. E. L. Munson, a few days of fine weather causes them to scatter again. He also remarks[27] that he "found Antelope rare during the summer along the Sun River and the Teton, but reasonably plenty in winter."

Richardson says:[28] "Some of them remain the whole year on the South Branch of that river [Saskatchewan] but they are merely summer visitors to the North Branch [about 200 miles away]. They come every year to the neighbourhood of Carlton-house, when the snow has mostly gone . . . and they retire to the southwards again in the autumn as soon as the snow begins to fall."

Then he adds an item which affords interesting light on the relentless process of developing a migratory instinct. "Almost every year, a small herd linger on a piece of rising ground not far from Carlton-house, until the snow has become too deep on the Plains to permit them to travel over them. Few, or none of that herd, however, survive until the spring, as they are persecuted by the Wolves during the whole winter."

To this, Grinnell adds: "In spring and autumn, the Antelope commonly shifted from summer to winter range and back again, and their migrations were made by regularly established roads, over which all the herd passed; so that at certain crossing places of the rivers, and at certain gaps between the hills, vast numbers of the animals passed along twice each year.

"Such a place was on the Missouri River, not very far below old Fort Berthold, where in autumn vast numbers of Antelope that during the summer had fed on the high coteaux to the northeast of the Missouri, crossed the river to winter in the rough bad-land country of the Little Missouri, and about the Black Hills.

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[27]Forest & Stream, Feb. 27, 1897, p. 164.

[28]F. B. A., I, p. 263.

"Again, at a place not far from old Fort Steel, near the head of the North Platte, there was a pass where many thousands of Antelope crossed each autumn, going south to certain wintering grounds in Colorado."[29]

From this, we may conclude that the Antelope is a creature of small home locality, and a permanent resident there when climate and food-supply permit, as is the case in the southern part of its range. But in the colder, snowier regions, it is driven to journey in search of better conditions; and though these movements are as often northward as southward, they are seasonal and somewhat regular, so that they are true migrations.

A Migration Incident

A curious stampede that took place during one of these movements, is thus narrated[30] by H. W. Skinner, of Chicago:

"Early in the spring of 1890, a party consisting of two trappers and three prospectors, besides myself, were going up the western side of the Green River, in Wyoming, as rapidly as the melting of the snow would allow. The wild animals were going up the river valley at the same time. Large bands of Antelope travelled parallel with us, and being unmolested (as for a number of days not a shot was fired), they would dash by within a hundred yards of us. We sometimes stopped for two or three days at a time, waiting for the snow to melt sufficiently to allow us to go ahead. While making one of these stops, we camped on a gentle slope facing the southwest. The snow had disappeared from the slope, but was still quite deep in the valley through which we were obliged to pass.

"As we lay quietly in our blankets one noon, taking turns at crawling under the wagon to get out of the intense heat of the sun, there suddenly came over the crest of the ridge northeast of us, not more than 50 yards distant, a band of Antelope numbering about 50. Being badly frightened by something, they dashed over the ridge, and were among us before we could spring to our feet. Probably half of the band ran directly through the camp. All tried to sheer off to the right, but the momentum and panic of the leaders were so great that they did not change their course quickly enough to avoid running over us. I do not know that any member of the party was actually struck by an Antelope, although some of the camp utensils were, as I remember the accompanying clatter; and a rifle that had been leaning against the wagon was knocked over and the stock broken. The entire affair was over in a very few seconds, of course. None of us recovered from our astonishment until the Antelope were far away."

[29] When Antelope, p. 582.

[30] Letter, April 3, 1901.

Primitive Numbers

In reading the accounts by Western travellers of a hundred years ago, one is disappointed at the lack of definite observations on even such a conspicuous creature as the Antelope. For example, in Buffalo Bill's autobiography of 328 pages, he mentions seeing Antelope but once, Elk twice, and no other animals, except, of course, Buffaloes.

From old journals, one gets vague, indefinite phrases; such as "generally distributed," "more or less common," "almost constantly in sight."[31]

Capt. J. C. Fremont, writing June 22, 1842, from Little Blue River, southeastern Nebraska, about where Hastings now is, says: "Antelope were seen frequently."[32]

More details are furnished by Rufus B. Sage, writing of his winter camp at Cherry Creek, on the Platte in the Pike's Peak country, Dec., 1842. He says: "The Antelope, too, seemed to have congregated from all parts, and covered the country in one almost unbroken band. Their numbers exceeded anything of the kind I ever witnessed before or since."[33]

H. B., of Albert Lea, Minn., writes: "In the summer of 1873 . . . I went west to Salina, Kan., on the Kansas Pacific—or Buffalo route—thence I went on foot up the Salina River, a long, hot walk of about 40 miles to the northward. . . .

"As I came out into the more open country, I could see thousands of what I supposed were Sheep, but could see no herders, and as I wondered at this, I saw one of the animals running past at short range, and for the moment, it looked like a small Deer. Then it came to my mind it was an Antelope. . . .

"There were bands of hundreds as far as the eye could survey, and here in this clear atmosphere that meant many miles."[34]

G. B. Grinnell, who crossed the Plains in 1874, writes: "Those of us who in the early days travelled the prairie from north to south, and east to west, used to wonder constantly at the great numbers of the Antelope which day after day were seen on all sides of the command, feeding, or resting, or running, in troops of 10 or 20, or 30; and later, when winter approached, gathering into great droves, which always numbered hundreds, and sometimes thousands. . . .

"Abundant as the Antelope was on the plains to the east of the Rocky Mountains, it was not less plenty in the rougher broken country among

[31]J. A. Allen, Nat. Hist. Mont. & Dak., 1874, p. 40.
[32]Expl. Exped., 1843, p. 16.
[33]Rocky Mt. Life, 1857, p. 290.
[34]Forest & Stream, Feb. 6, 1911, p. 177.

the mountains. Looking down from the top of a high butte, over a broad basin, in North Park, Colorado, I have seen the country below me almost covered with Antelope of all sizes and ages; and could trace, winding among the sage brush, deep trails which they had worn in their passage between two passes, one of which led into, and another out of, this basin.

"In the same way, on the Laramie Plains, especially at a distance from the railroad, Antelope were always in sight, and in great numbers."[35]

Concerning its numbers farther west, Newberry says: "Though found in nearly all parts of the territory of the United States west of the Mississippi, it is probably most numerous in the valley of the San Joaquin, Calif. There it is found in herds literally of thousands; and though much reduced in numbers by the war which is incessantly and remorselessly waged upon it, it is still so common that its flesh is cheaper and more abundant in the markets of the Californian cities than that of any other animal."[36]

According to J. C. Hoxie, J. S. Drury, S. F. Dickenson, and many other Californian pioneers with whom I talked at Bakersfield, Calif., Oct. 3, 1899, in those early times, bands of 2,000 or 3,000 were seen commonly on the plains of California.

Charles H. Stonebridge, of New York, tells me that in the August of 1875, while crossing Wyoming, he saw daily from 500 to 3,000 Antelope in bands numbering 100 or 200 each. In April, 1879, they were just as plentiful in the same region, also in western Nebraska and in Utah.

Similar testimony is borne by many travellers for the open country east of the Rockies.

In the Dakota Badlands, during the early '80's, they were still abundant. Howard Eaton tells me that, in 1884, he saw there as many as 8,000 and 9,000 in a day. Even as late as 1896, they abounded in Montana. Dr. Edward L. Munson, of the U. S. Army, gives credence to the report that in the great blizzard of December of that year "40,000 Antelope took shelter in the coulees along Milk River alone, in Montana, near his post, Fort Assiniboin," and that between Havre and Glasgow (125 miles) a band of them might be seen every half mile.[37] These probably were the Antelope population of a region a couple of hundred miles across, concentrated in the sheltered valley.

Had they been the entire population of that north end of the range, it would give about one Antelope to the square mile; but we have evidence of many other bands in the country, at least doubling the number. Yet

[35]When Antelope, pp. 600 and 582.
[36]Pac. R. R. Reports, 6, 1857, Zoology, p. 71.
[37]Forest & Stream, Jan. 2, 1897, p. 7.

we know that Antelope were far from abundant then—in the old-time sense.

During early days in New Mexico (about 1892) we could usually reckon on seeing a band of a dozen or 20 Antelope on the open plains every 10 miles or so, during the fall. The region that I knew, and rode in daily, was some 60 miles long by 5 wide. In this were 5 well-known bands of Antelope, each keeping its own home locality and each numbering about 20. This would give 100 Antelope to 300 square miles. But all the "old-timers" agreed that there were "no Antelope in the country now. Just an odd one here and there, and nothing to compare with the herds of the days gone by," they said.

W. N. Byers, of Denver, tells me that in 1868 he witnessed a Ute "surround" of Antelope in North Park, Colo., where 4,400 Antelope were killed. As the entire Park is 5,000 square miles, only a small part of it could have been driven, and, furthermore, many of those started, escaped. We are safe, however, in putting the numbers as high as 3 Antelope per square mile.

But the Park was not an ideal place for the species. The snows were too deep for a high rate of population. In the Yellowstone Park proper (3,000 square miles, about one third of it Antelope country) there were, according to official estimate in 1896, 1,000 Antelope—that is, 1 to every square mile. Yet hunters considered them very scarce, and said that it would take 20 times as many (that is, 20 to the square mile) to make really "Antelope country." At which rate in primitive times, the total of Antelope might have reached 40,000,000.

Major J. B. Pond once gave me an important item: "In the winter of 1868–69," he says, "I travelled on the railroad newly opened between Denver and Cheyenne. All the Antelope had left the open plains, and were now sheltering among the foothills. For 10 or 12 miles in Cache le Poudre valley and all the way west of the train, about $\frac{3}{4}$ to $\frac{1}{2}$ mile away, was one long band of Antelope, 20 to 40 rods wide, practically continuous, and huddled together for warmth. Their numbers changed the colour of the country. That winter many wagonloads were brought to Denver and sold, 3 or 4 carcasses for 2 bits (25 cents), that being the smallest coin in use."

If there is no error in these figures, it meant 2,000,000 Antelope. This great concourse came from the Plains north and east. They would not have come from the west, because it was rugged mountainous country; nor from the south, because of the storms; and it is extremely unlikely that they came from a greater distance than 200 miles. Reckoned by area, therefore, they represented about the fiftieth part of the Antelope population of

America; this would give over 100,000,000 as the aggregate of Antelope on the range. At this time they must have far outnumbered the Buffalo.

To approach the question from another angle: In 1894, there were, by actual census, over 25,000,000 Sheep in Great Britain, scattered on its 88,000 square miles; that is, there was an average of over 300 Sheep to the square mile. I travelled over the length and breadth of the land, and yet got no impression of abundance of Sheep that could compare with the abundance of Antelope on the Plains. One may argue that the Antelope on the Plains are more visible than the Sheep on the fields. True. Let us, then, divide the Sheep by 10, and claim 30 Antelope for the square mile in the better half of 2,000,000 square mile of their range (that is, the Plains east of the Rockies and in California), and half that much in the other 1,000,000. This would put the Antelope at 45,000,000 as late as the '70's.

Or, to offer it in American terms, the State of Illinois has over 55,000 square miles of land on which in 1900 there were 1,500,000 Horses, 3,000,000 Cattle, and 1,000,000 Sheep. This would give us 10 head of stock to the square mile. Yet no one can pretend that the Cattle, as seen from the train window, are at all equal in numbers to the Antelope as they were to be seen from the Union Pacific trains; the Antelope seemed at least twice as numerous.

From these various facts, it will be seen that in many regions, the species probably exceeded 20 to the square mile. Although there were vast areas which fell far below this, these were offset by the greater density elsewhere.

Discarding the high estimates already arrived at, this would, nevertheless, make the 20,000,000 given in my "Life Histories," a very low—a far too low—estimate. My impression is that they were nearly as numerous as the Buffalo. G. B. Grinnell has told me personally that he considers that the Antelope exceeded the Buffalo in normal times; that is, they might easily have totalled 40,000,000 about the year 1800.

"In view of the greater territory occupied by the Pronghorn, and its known abundance," says Nelson, "it may be considered a conservative estimate to place its probable original numbers at not less than 30,000,000 to 40,000,000, and possibly more."[38]

Numbers To-day

The accompanying map shows a surprisingly slight shrinkage in the range of the species—a shrinkage which, unfortunately, does not correspond with the actual reduction of its numbers.

[38] Pronghorn, pp. 3–4.

According to Dr. T. S. Palmer, "The Biological Survey published an estimate for the year 1908, based on the best figures then obtainable, showing a total of 17,000 in the United States, or, adding those in Canada, a total of less than 20,000 north of Mexico."[39]

This was probably the low-ebb time. For we know now that there are over 30,000 north of Mexico; and although dwindling on the open plains, they are slowly but steadily increasing, thanks to the Parks and Refuges.

Dr. E. W. Nelson's Bulletin on this animal gives in full the literal facts on its numbers and distribution in 1922–24. I reproduce the table:

Distribution of Antelope in North America, 1922–1924

Region	Areas	Number of antelope	Region	Areas	Number of antelope
Arizona	18	651	Canada:		
California	6	1,057	Alberta	5	1,030
Colorado	28	1,233	Saskatchewan	9	297
Idaho	14	1,485	Total, Canada	14	1,327
Kansas	1	8	Mexico:		
Montana	44	3,027	Coahuila*	1	600
Nebraska	10	187	Chihuahua*	1	700
Nevada	11	4,253	Durango		(?)
New Mexico	31	1,682	Sonora	4	595
North Dakota	5	225	Lower California*	2	500
Oklahoma	2	23	Total, Mexico	8	*2,395
Oregon	4	2,039	Summary:		
South Dakota	11	680	United States	264	26,604
Texas	42	2,407	Canada	14	1,327
Utah	10	670	Mexico	8	*2,395
Wyoming	27	6,977			
Total, United States	264	26,604	Grand total	286	30,326

*Estimated.

Joseph J. Hall, of Denver, a leader in conservation and an expert on Antelope, writes me that, in his opinion, the Antelope bands in Colorado are, in some cases, holding their own, but in the aggregate they are decreasing. In considering the whole country, he says: "The figures furnished by the Biological Survey are much too high. I spent a great deal of time about a year ago, attempting to collect these figures, and at that time, I put the number in the United States at 15,000. I talked with Director J. D. Figgins, of the Colorado Museum of Natural History, this morning, and he put it at 13,000 in the United States."[40]

[39]Progress of Game Protection in 1908, Yearbook, U. S. Dept. Agri., 1908, p. 582, pub., 1909.

[40]Letter, March 23, 1926.

The Nemiskam Park

There are a number of Antelope Preserves in America. It may be said that, as a whole, the large areas are succeeding and the small ones failing. By far the most successful is the Nemiskam National Park in southeastern Alberta.

In 1914, it was my privilege to be one of a committee of two to select 3 or 4 tracts of land as possible Antelope preserves. The other member was Maxwell Graham of the Wild Life Department at Ottawa. We visited personally and selected 5 considerable areas in southern Saskatchewan, Alberta, and Manitoba. In the last case, it was the Carberry Sandhills.

Having set apart three of these tracts, several attempts were made to secure herds of Antelope for stocking, by driving them into a corral with chutes. These efforts utterly failed. Then it was remembered that on the southeast Alberta tract was a herd of Antelope permanently located. It was their choice home land.

"The tract they were feeding on comprised approximately 5,000 acres, and was already partly surrounded by a good post and barb-wire fence. With all possible speed and caution, the barb-wire was replaced by a higher fence of woven wire, and the Antelope were successfully and securely confined by a fence that was both Antelope- and Coyote-proof. The work was accomplished without disturbing the animals, and 42 of them were captured in this area of their own selection.

"The reserve thus established was named Nemiskam National Park in 1922, and it contains all vegetation peculiar and necessary to the Antelope diet as well as an abundant water supply. It is situated a short distance from the town of Foremost, and the supervision of the herd is in the hands of a resident caretaker."

Complete protection from poachers and starvation, and very nearly complete immunity from the inroads of predatory animals and birds, have made of this Refuge a most encouraging success. There has been a steady increase, and the 42 of 1915 had become 180 in 1923; in 1925 they had, by natural increase, become 235 Antelope.[41]

The Prong Horns

The horns are perhaps the most remarkable feature of this remarkable animal. Though true horns like those of a Cow or Goat, they are yet branched in shape, and shed each year like the antlers of a Deer. This last fact was first announced by Rufus B. Sage, who wrote, about 1841, of the

[41]Nat. Res. Canada, Mar., 1925, Dept. Interior, Ottawa.

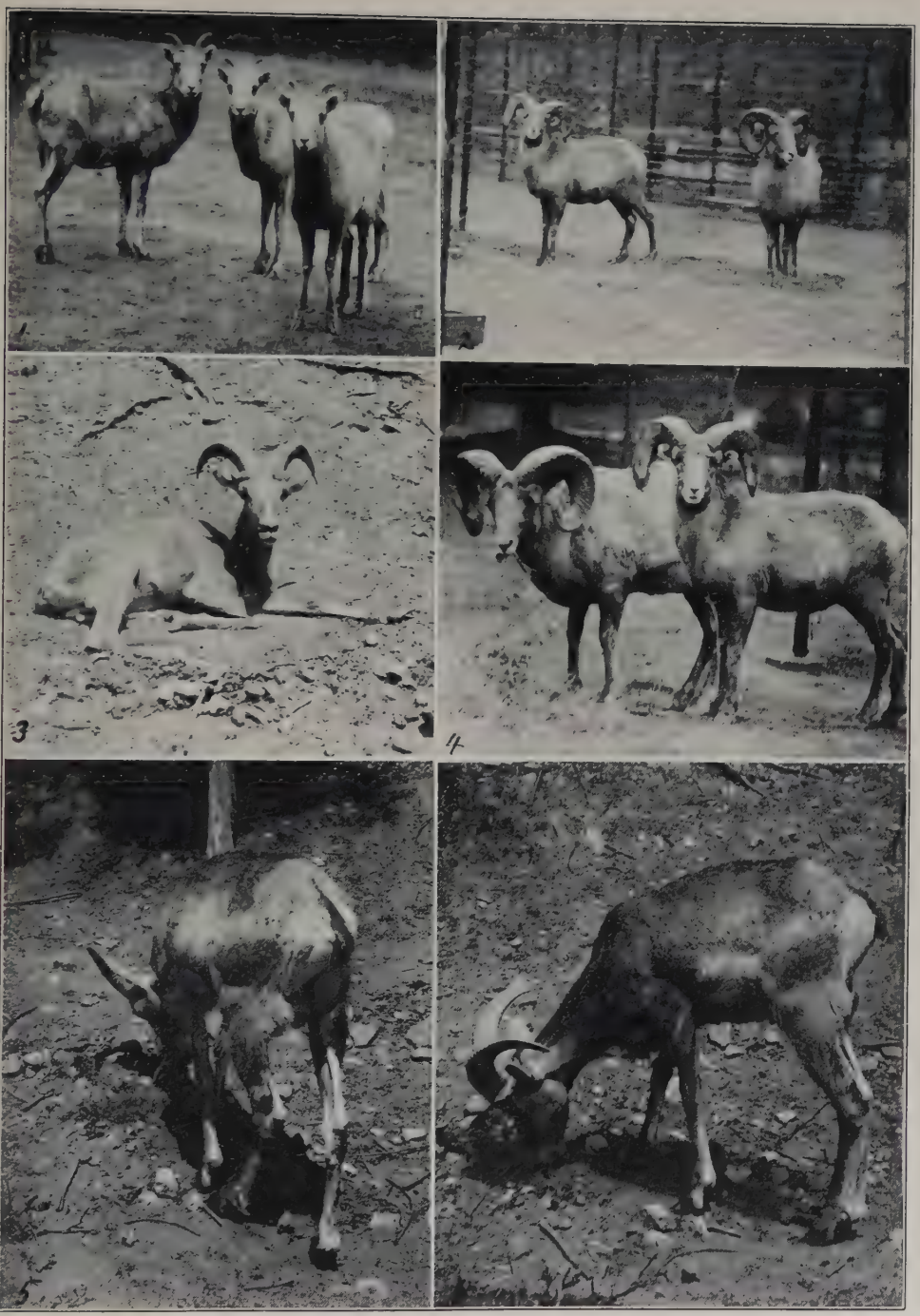

PLATE LXXV.—BIGHORN SHEEP IN WASHINGTON ZOO

1. Ewe and yearlings. 2 and 4. Full-grown Rams. 3, 5, 6. Young Rams in the so-called "Ibex" stage

Photographs by E. T. Seton

PLATE LXXVI.—THE TAYE OR CALIFORNIAN DEER

Earliest known picture of Bighorn
From Venegas' "A Natural and Civil History of California,"
Madrid, 1758.

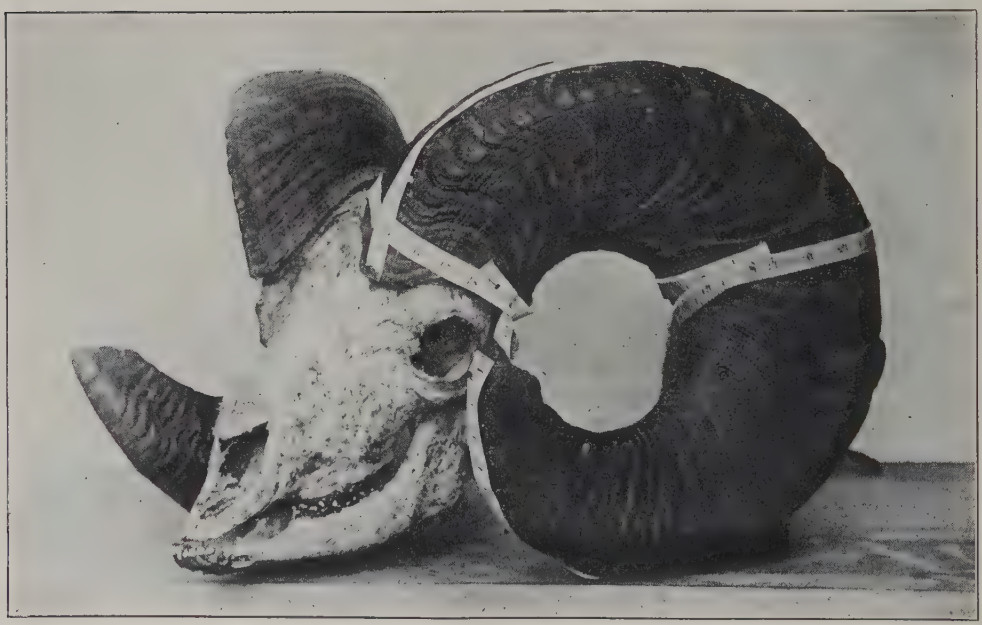

PLATE LXXVII.—MASSIVE HEAD OF BIGHORN IN COLLECTION OF MACKAY & DIPPIE OF CALGARY

The skull and horns weigh 43½ lbs.

Antelope:[42] "The male, however, is equipped with hook-shaped antlers, ebony-coloured, and 6 or 8 inches in length, which he sheds annually in the months of November and December."

Dr. C. A. Canfield, of Monterey, Calif., made the discovery independently in 1858.[43]

Judge Caton investigated[44] the growth of horns in detail. His observations show that the male Antelope has, at birth, a little bump over each eye. At 4 months old (that is, at the end of September) this breaks through the skin as a small and somewhat movable horn. In January, usually when about an inch long, this is dropped, or pushed off by the new horn growing below it. This begins on the top of the bony core, which also grows rapidly, so that in a couple of months the whole horn is about 3 inches long. The next year, the shedding takes place earlier, but the bony core (now much bigger, of course) remains. The prong is developed above the bony core.

Old bucks shed in October, that is, immediately after the rut. They have an advantage over members of the Deer tribe in one particular—a Deer is hornless for some time after shedding the antler, but an Antelope's new horn is already well sprouted before the old one is dropped. The outlines shown in the Plate may be considered as diagrammatic expression of the horn development. Actual horns in series like those of the Wapiti (Plate II) are not at hand.

It is well known that true horn is theoretically a mass of consolidated hairs; but in the horn of this unique animal is visibly demonstrated the whole process,—the growth of the hair, the consolidation into horn, and the actual shedding, as with the hair of the coat.

It seems that the larger and lustier the individual, the sooner his weapons are shed. W. R. McFadden, of Denver, tells me that, early in the fall of 1894, while shooting on the Elkhead River of Colorado, he fired at a buck Antelope that had unusually large, fine horns. It ran some 20 yards, and fell dead. On coming up, he was disappointed to find that it had for horns only a pair of miserable little spikes. The puzzle was explained when he found both of its other horns, a large pair, lying on the ground where it fell. Evidently it had been at the point of shedding these when shot.

M. P. Skinner supplies the following details of the dates at which the Antelope shed their horns:

"Season of 1917–18: Nov. 15 to Dec. 2; season of 1919–20: Oct. 20 to Nov. 25; season of 1920–21: Oct. 31 to Nov. 28.

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[42]Rocky Mt. Life, 1857, p. 56.

[43]Pub. in Proc. Smith. Inst., 1866. See Caton, Ant. & Deer, p. 26.

[44]As above, pp. 25–35.

"It is quite usual for the 'old-timers' to say that early shedding is a sign of an early spring. But such does not seem to be the case. It would appear that the condition of the animals is the main factor; and since the healthy condition of the animals on the open range is largely dependent on the forage, it would seem that the comparative dates of horn shedding are more or less directly connected with the growth and condition of vegetation during the summer preceding the shedding season."[45]

In an article by G. B. Grinnell[46] it is clearly shown that the dropped horns disintegrate in about a year; which explains why so few were ever found on the Plains.

The female yearling shows little points of horn. These never exceed 2 or 3 inches in length.

Horns of the normal type are shown in the first figure of Plate LXI; and the number of variations from this is small.

Record Horns

In Rowland Ward's "Book of Records,"[47] the longest horns of this species given are the property of the Booth Co., Los Angeles, Calif. They measure: Length, $20\frac{11}{16}$ in.; girth, $8\frac{1}{2}$ in.; tip to tip, $19\frac{3}{4}$ in.

Next is the Wilson Potter head: Length, $20\frac{7}{16}$ in.; girth, $7\frac{1}{3}$ in.; tip to tip, $5\frac{1}{2}$ in.

Third is Dr. H. M. Beck's specimen: Length, 20 in.; girth, $8\frac{1}{2}$ in.; tip to tip, $10\frac{3}{4}$ in.

Closely following this are the J. Whitaker head with length of $17\frac{1}{4}$ in.; the J. G. Millais head, 17 in.; the J. C. Phillips head, $16\frac{1}{8}$ in.

For long, the record was held by a pair in the possession of E. S. Dodge, of Arcadia Ranch, Ariz., who shot the buck near Oracle, Ariz., Oct. 22, 1897. The measurements are given as follows:[48]

Length of left horn around curve	$17\frac{1}{4}$ in.
" " right " " "	$17\frac{3}{8}$ "
Spread of horns at tip " "	$6\frac{1}{2}$ "
Spread at widest part	15 "
Girth of left horn at base	$6\frac{1}{2}$ "
" " right " " "	$6\frac{1}{4}$ "
" " horn at largest place	$10\frac{1}{2}$ "

[45] Journ. Mamm., Aug., 1921, pp. 172–73.
[46] Journ. Mamm., May, 1921, pp. 116–17.
[47] 1922 ed., pp. 107–08.
[48] Recreation, Oct., 1898, p. 307.

All of the foregoing are owners' measurements. Rowland Ward gives his own measurements of the following:

The St. George Littledale head from Wyoming: Length, $15\frac{3}{4}$ in.; girth, $6\frac{1}{4}$ in.; tip to tip, $5\frac{7}{8}$ in. The P. B. Vander Byl head also from Wyoming: Length, $15\frac{3}{4}$ in.; girth, $6\frac{1}{4}$ in.; tip to tip, $8\frac{3}{4}$ in. Also 6 other heads of 15-in. length of horn or upward, and 8 that are between 14 and 15 in. Anything over 14 in. is considered first class.

Freak Horns

The only "freak" type that is often seen is that known as the "droopers." An example is shown in Plate LXX. Such disfigurements are probably the result of accident in early life. But obviously, the buck with "droopers" once will always have them, as the fundamental horn cores themselves are abnormal.

W. H. R., of Laramie, Wyo., says of the specimen whose "droopers" are figured: "This animal was killed on a high, dry ridge, between the two Laramie rivers, about 12 miles from the town of Laramie, Wyo., some 4 years ago.

"The attention of hunters was first called to the animal by his walking backward, in a half circle, when feeding. He was very wild and avoided death for many months, although being continuously hunted. More than 100 shots were fired at him before he met his death. He was fat and in fine condition when killed. Examination discloses the fact that on account of the peculiar shape and length of his drooping horns he could not feed satisfactorily while walking forward, so he walked backward in order to reach the grass."[49]

Grinnell records a pair that were crossed in front of the face. (Plate LXX.)[50] He also says: "On one occasion in North Park, Colo., I killed a buck Antelope with four horns, the additional ones being solid cylindrical black masses of aglutinated hair, like the ordinary horn sheath growing from the skin of the head behind the horns. Of course, they had no horn cores. One of these horns was an inch in diameter, and about $2\frac{1}{2}$ inches long, while the other was slightly longer. I attempted to preserve the skull and skin of this head, but it was lost off a pack."[51]

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[49]Recreation, June, 1897, p. 426.
[50]Forest & Stream, Aug. 13, 1910, p. 252.
[51]Forest & Stream, July 14, 1906, p. 50.

Why the Prong?

Long ago, Darwin confessed himself puzzled[52] by the form of the Springbok's horn, inasmuch as the incurve of the points apparently rendered them useless for attack. It seems as though a simple straight spike would be much more effective. The incurved point and its halfway snag seem like buttons on the rapier, like efforts to disarm the well-armed knight while leaving him in possession of his weapons. But many observations made on the Antelope in the Washington Zoo, while I was painting their portraits, showed me how true it is that not the smallest detail in nature is without distinct purpose, for which it has been carefully adapted through ages of experiment. I learned that the prong—so far from being a button on the rapier—is a hilt that protects the bare flesh farther up, as described later. In short, the recurved point enables the buck to strike his adversary in the throat, where the skin is thinnest.

The Heliograph

The bristling mane of the species is erected under excitement, and no doubt serves as a means of expression and communication. But a much more remarkable detail of the Antelope's anatomy is the white area on each buttock. This seems at first like the rest of his spots—a mere patch of white coat; but it is found to be specialized for an important service. It is composed of hair graded from short in the centre, to long at the front edges. Under the skin of the part is a circular muscle by means of which the hair can, in a moment, be raised and spread radially into two great blooming twin chrysanthemums, more or less flattened at the centre. When this is done in the bright sunlight, they shine like tin pans, giving flashes of light that can be seen farther than the animal itself, affording a conspicuous identification mark that must be of great service to the species.

Many years ago, while riding across the upland prairies of the Yellowstone, I noticed certain white specks in the far distance. They showed and disappeared several times, and began moving southward. Then, in another direction, I discovered other white flecks, which also seemed to flash and disappear. A glass showed them to be Antelope, but without wholly explaining the flashing or the moving, which ultimately united the two bands.

I made a note of the fact, but did not understand it until the opportunity came to study Antelope in the Washington Zoo. I had been quietly watching the grazing herd on the hillside for some time; in fact, I was sketch-

[52] Descent of Man, 1871, II, p. 239.

ing, which affords an admirable opportunity for watching animals a long time minutely. I was so quiet that they seemed to have forgotten me, when, contrary to rules, a Dog chanced into the park.

The wild Antelope has a habit of raising its head every few minutes while grazing, in order to keep a sharp lookout for danger; and these captives maintained the tradition of their race. The first that did so saw the Dog. It uttered no sound, but gazed at the wolfish-looking intruder; and all the long white hairs of the rump-patch were raised with a jerk that made the patch flash in the sun. Each grazing Antelope saw the flash, repeated it instantly, and raised its head to gaze in the direction toward which the first was looking. At the same time, I noticed on the wind a peculiar musky smell—a smell that certainly came from the Antelope—and was no doubt an additional warning.

Some time later, I had the chance to make a careful dissection of the Antelope's rump-patch; and the keystone to the arch of facts was supplied. My specimen, taken in Jackson Hole, was a male under 6 months old, so that all the proportions, and indeed the characteristic details, were much less developed than in the adult. (See Plate LXX.)

The fresh skin was laid flat on a board, and then the pattern and mechanism of the rump-patch were clearly seen. The hairs at the upper part of the patch (a) were about 4 inches long, grading to the centre (b) and the lower parts, where they were under 2 inches long; all snowy white and normally lying down flat, pointing toward the rear. At the point (b) among the roots of the hair, was a gland secreting a fluid having a strong musky smell. On the under side of the skin was a broad sheet of muscular fibres, which were thickest around b; they have power to change the direction of the hair, so that all below b stand out, and all above are directed forward.

It seems, therefore, that as soon as an Antelope sees some strange persons or threatening object, this muscle acts; and the rump-patch is instantly changed into a great double disk of white that shines afar like a patch of snow. Further, in the middle of each disk is exposed a brown spot (the musk-gland), from which a quantity of the musk odour is set free; and its message is read by those who have noses to read.

Of all animals, man has the poorest nose. He has virtually lost the sense of smell, while, among the animals next in the scale, scent is their best faculty. Yet even man can distinguish this danger-scent for 20 or 30 yards down the wind, and there is every reason to believe that another Antelope can detect it a mile away.

Observations on captive animals have thus afforded the key to those

made on the Plains. I know now that the flashing flecks seen on the Yellowstone uplands were the interchanging signals of the two bands, the smaller of which, on getting the musky message, "Friends," had laid aside their fears and joined their kindred. This, it will be seen, is simply a heliograph. Man flatters himself that he was the first inventor of flash communication; but he is wrong—the Antelope used it thousands of generations before it was dreamed of by mankind.

The Smell Glands

Many animals are furnished with glands that produce a strong-smelling stuff that answers in some cases as a defense, but mostly as a method of intercommunication. A Peccary has a scent-gland on its back; a Deer has one in each foot and on the hock; a Goat has several about the head. The Antelope has every one of these various smellers, each tainting the adjoining air in a way of its own, and doubtless for a purpose that none other could serve.

There are numerous theories as to the purpose of the glandular system. Judge Caton thinks that these many pungent odours help to protect the Antelope from flies and mosquitoes; but it seems more likely that their chief use is for intercommunication.

The glands on the jaw seem related to the sexual system, as they are largest in the buck and most active in rutting time; those on the rump, as seen, have a place in the heliographic apparatus; and the purpose of the others, though not yet understood, is almost certainly to serve in conveying the news.

How can they do so? As possible answer to this, rather than as ascertained fact, I suggest that an Antelope passes along a certain plain, eating at one place, drinking at another, lying down in a third, being pursued by a Wolf for half a mile. The Wolf gives up the unequal race, and the Antelope escapes at his ease. A second Antelope comes along. For him, the foot-scent from the interdigital glands marks the course taken by his fellow, as clearly as the track in the snow would do for us. Its strength tells him somewhat of the time elapsed since it was made; and its individuality shows whether his predecessor was a stranger or a personal friend, just as surely as a Dog can tell his master's track. Again, the hock-scent exuded on the plants or ground where the first animal lay down, informs the second one of the action. At the place where the Wolf was sighted, the sudden diffusion of the rump-musk on the surrounding sagebrush will be perceptible to the newcomer for hours afterward; and the cause of it will be made clear

when the Wolf trail is detected. This may sound a far-fetched tale of Sherlock Holmes among the Beasts. But not so, if we remember that in these animals, their sight faculty is at least as good as ours; that their scent faculty is of still greater value to them, and finally, if all this had been recorded in the snow, we also could have read it with absolute precision.

The uniform of the species is itself an important means of intercommunication. Its conspicuous colouring labels the creature afar as surely an Antelope, for information of friend and foe. Thus the one realizes that it is useless to follow, and the other that it is needless to flee.

It is interesting to note that the Antelope's tail does not count in its code of expression, although, in the Whitetailed Deer—which is not furnished with the discograph—the tail is greatly developed and specialized as a means of communication. Parallel cases are the Wapiti, whose tail is inert, but whose crupper-patch is very active; and the Moose, whose tail is a dummy, or sleeping member of the firm, but whose hip on each side is furnished with an erectile patch that seems to serve the purpose of expression.

As noted elsewhere in this volume, other animals that have highly developed musk-glands, have reduced the tail to a minimum; for example, Muskox, Musk-deer, and Musk-hog.

Gait

Concerning its gait, Audubon and Bachman say:[53] "Their walk is a slow and somewhat pompous gait, their trot elegant and graceful, and their gallop or 'run' light and inconceivably swift; they pass along, up or down hills or along the level plain, with the same apparent ease, while so rapidly do their legs perform their graceful movements in propelling their bodies over the ground that, like the spokes of a fast-turning wheel, we can hardly see them, but, instead, observe a gauzy or film-like appearance where they should be visible."

Like most of the Deer in this work, the Antelope has three different gaits: the trot, which is, as Audubon says, "elegant and graceful," with just a suggestion of show-off in it, as the slim-legged creature prances away with mincing steps and head held high. Second, the bouncing or bounding in air, two or three feet from the ground, rising and dropping with all four feet held rather stiffly together, much after the fashion of Mule-deer and Coast Blacktail. Sometimes these bounds are made in rapid succession before settling down to a real run. Why? Undoubtedly for the same reason that the Jackrabbit makes a "spy-hop." They are to give it

[53] Q. N. A., II, p. 198.

momentary high view, whence it can scan the surroundings and look out for danger.

Having satisfied itself as to the direction and need of departure, the Antelope proceeds to demonstrate its famous speed, like the run of the Whitetail, with head well forward, and legs outstretched in mighty, long, low bounds that eat up the dusty miles.

So swift are they that Audubon seemed to think that they could cover a mile a minute.[54]

Scorns a Common Dog

There can be no doubt that the Pronghorn is the speediest four-foot native to America—one of the fastest in the world.

I have gathered many observations on the speed of certain quadrupeds, and have arrived at a scale, which, however, I submit with much hesitation. Of course, we have no actual gauge on the speed of the wild creatures, and must reach it by various devices and comparisons, eliminating guesses. The estimates of hunters, etc., are always too high; besides, it is a misleading fact that of two animals going at the same rate, the smaller always *appears* to be going the faster.

It is safe to say that the Horse, the ancient standard of speed, still holds its own. There seems no good reason for supposing that any creature on legs—two, three, or four—ever went for any distance faster than a blood Race-horse. Salvator's mile in 1 minute and 35½ seconds is the fastest pace reliably recorded for anything afoot.[55]

On the uplands of Mexico, in 1892 and 1893, I several times saw my hunting comrade, William Allen, on his favourite Horse, "Spider," ride into a bunch of Antelope going their best, and with everything in their favour. "Spider" was locally known as a racer, although only a quarter-blood.

On the Little Missouri, I saw some rather good greyhounds overtake a Mule-deer on the level, but fail utterly when it came to a buck Antelope. These same Dogs could catch a Coyote in a very short race.

Commenting on the relative speed of various Plains animals, Capt. R. B. Marcy says:[56] "The greyhounds have, upon several different occasions, run down and captured the Deer and the Prairie-rabbits, which are also considered very fleet, but although they have had very many races with the Antelope under favourable circumstances, yet they have never, in one instance, been able to overtake them; on the contrary, the longer the

[54]Q. N. A., II, p. 201.

[55]My authority is Samuel W. Taylor, editor of the Rider and Driver, New York; the record is Salvator, 4,110, Monmouth Park, N. J., U. S. A., Aug. 28, 1890.

[56]Expl. Red River, 1854, p. 62.

PLATE LXI.—ANTELOPE SIGHTING DANGER

(*Antilocapra americana* (Ord))

PLATE LXII.—ANTELOPE APPROACHING TO ATTACK

From a photograph by Mrs. G. G. Seton

PLATE LXIII.—HEADS OF YOUNG BUCKS

chase has continued the greater has been the distance between them. The *Cervus virginianus* (our Red-deer) has generally been considered the fleetest animal upon the continent after the Horse, but the *Antilocapra americana*, or Pronghorned Antelope of the Plains, is very much swifter."

As an experience with ordinary greyhounds, there is in *Forest & Stream* for Sept. 8, 1906 (pp. 375–76), a long and illuminating article on "Antelope Coursing." The writer says:

"The greyhound depends solely upon his speed and eyesight to catch an animal; and if the pursued animal gets over a swell, or into a draw out of his sight for a short time, he will find it again only by chance, having no scent or ability to trail. His forte in overtaking game lies in his wonderful burst of speed at the commencement of the chase. He has comparatively little bottom, and if his quarry is not overtaken in the first two or three miles, the chances are that it will escape. The greatest difficulty in chasing Antelope with the greyhound is to get a fair start, which is next to impossible, because the hunter is usually perceived at a distance.

"From a half mile to a mile is as close as they will permit one to approach before running; often not that near. The difficulty in overtaking them even with the greyhound, when they have a start of a mile, will readily be perceived.

"Their bottom fully equals their speed. From the chases we had, we were led to believe that they are capable of maintaining great speed for 10 miles or more. This is something no greyhound we have seen can do; so that if you cannot approach them closely, say, within one or two hundred yards, before detection, your chances of outrunning them are poor; at least this was our experience."

He then gives details of a long hunt, about 20 miles, in which they were able to chase the Antelope in 4 relays; for the Antelope, as usual, ran in a circle 8 or 10 miles across—that is, around the home region. The event proved a disastrous defeat for hunter and Dogs, though the Antelope coursed were 2 kids.

Outrun by Thoroughbreds

Joseph J. Hall, of Denver, points out, however, that all of these greyhound defeats were in the days when only ordinary or second-class hounds were used in the match. It was quite different when thoroughbreds and high-class greyhounds were brought on the field. Indeed, he says: "In my opinion, a good greyhound can catch the average Antelope."

In confirmation of this, Dr. George B. Grinnell writes me that in 1873, "Gibbon," a phenomenal greyhound belonging to General Stanley, did on

22 occasions, in fair race, catch unwounded Antelope, some of which were bucks. And Col. W. P. Evans, 11th Inf., U. S. A., writes me, Nov. 28, 1907, that Colonel Gardiner had a bitch greyhound, which he saw catch a fine buck Antelope in 1878, near Fort Dodge, Kan. She had several others to her credit, but was undoubtedly a very unusual hound. As Governor St. John, of Kansas, said to Buffalo Jones after much experience, "It takes a mighty good greyhound to catch a mighty poor Antelope."[57]

M. E. Allison, in his article on "Coursing the Antelope with Greyhounds," tells of a remarkable hound, named Mike, who caught 3 Antelope in one day.[58] The greyhound, however, was assisted by another speedy hound, as well as by men who manœuvred the chase, and by means of a wagon, relieved the Dog of much hard travel.

But these were unusual Dogs of a rare strain, the picked and highest product of long breeding for speed. If we were in a position to pick out individual Antelope as we have picked the Dogs, I still believe the Dogs would be left far, far behind.

Measuring His Speed

F. Earle de Vore, writing on motoring after game in Colorado, says:[59] "I have timed them, and any good doe Antelope can run 43 miles an hour by speedometer measurement." This, I take it, means the rate for one mile. There is no creature on legs that could actually run 43 miles in one hour.

I have often heard railroad men tell of races between trains and Antelope. When running at the ordinary rate of 25 or 30 miles an hour, the engine could not pass these fleet coursers; but when the engineers put on all speed, so as to run at a 35-mile rate, the train forged ahead. In a mile or so, the Antelope turned aside and gave it up, disgusted to find that, at last, there was something on the plains that could outrun them.

I have computed the speed of many other animals by counting their bounds to the minute, and then afterward measuring those bounds in the snow. On others, I have made a number of comparative observations from railway trains and motor cars going at a known speed. Above all, I have always kept in mind the fact, when it is on available record, that such can catch so-and-so, in a fair race. The mineralogists make a scale of hardness on units, each of which can scratch the one below it, and be scratched by

[57] Forty Years of Adventure, 1899, p. 194.
[58] Big Game of N. A., edited by G. O. Shields, 1890, p. 340.
[59] Field & Stream, Aug., 1921, p. 298.

the one above. I have acted on this plan in making my scale of swiftness, only for "scratch" I read "catch."

In general, I have found that the wild animals are less swift than is commonly supposed, and that their strong point is the quickness with which they can get up speed. Their "muzzle velocity" is indeed a matter of life and death, for most predaceous creatures, especially the Cats, give up the chase at once if they fail on the first dash. Furthermore, I have been continually impressed by the smallness of difference in speed. The few seconds that one animal saves in making its mile is evidently of vital importance. The scale I have attempted is founded on the animal's best rate for a mile. A rate that is representative has been chosen, rather than the phenomenal or the highest record of each species.

Thus the best Horse record for a mile is at the rate of over 36 miles an hour. I prefer, however, to set the Horse at 34 miles an hour, as many Horses attain this rate.

Race-horse	Speed for a mile is at the rate of 34 miles per hr.
Pronghorned Antelope	" " " " " " " " " 32 " " "
Greyhound	" " " " " " " " " 30 " " "
Texan Jackrabbit	" " " " " " " " " 28 " " "
Common Fox	" " " " " " " " " 26 " " "
Northern Coyote	" " " " " " " " " 24 " " "
Foxhound	" " " " " " " " " 22 " " "
American Graywolf	" " " " " " " " " 20 " " "

In this connection, it is interesting to note that the best speed of a man for 100 yards is $9\frac{3}{5}$ seconds; which is at the rate of $21\frac{1}{3}$ miles an hour. A man's best speed for a mile is 4 minutes $12\frac{3}{4}$ seconds; or at the rate of 14 miles an hour. An ordinary runner makes a mile in 5 minutes (i. e., at the rate of 12 miles an hour). So that what actually counts in the race is, as usual, the *trifle more speed* that each animal can command.

Racing

The pride of the athlete is not wanting in the Antelope. Long demonstrated as the swiftest quadruped on the Plains, he lost no chance of showing other runners what real running was like; and without doubt, in those earliest days, he was in every race, and rejoiced in giving his rival "the dust" by passing in front of him.

Nelson writes:[60] "One of the most extraordinary peculiarities in the

[60]Pronghorn, pp. 6–7.

psychology of the Pronghorn is its desire to pass in front of a mounted man or a team moving by at no great distance from a band.

"From 1883 to 1888, the writer lived in a section of Arizona where Antelope were plentiful, and frequently hunted them and often saw them when riding in a wagon or on horseback along roads or trails crossing their haunts.

This area was mainly covered by a great scattered forest of pinyons, cedars, and junipers, interspersed with many small grassy parks of varying size. During the summer, Antelope were distributed in small bands in these parks, sometimes 2 or 3 individuals together and at other times from 15 to several times that number.

"It was a common occurrence when a traveller passed along these roads, for a band to stand from 75 to 200 yards away watching him. Then they would suddenly start and run one after the other parallel to the course taken by the traveller, and dash across the road immediately in front of him, often within a short distance, after which they would stream away and disappear among the scattered tree growth. When travelling on horseback, and happening upon Antelope in such places, the writer often amused himself by spurring his Horse to a gallop, and continuing his course in a direction which would take him by and away from the animals. At such times he tried to appear unconscious of their presence, and this procedure almost invariably brought the expected response, and the animals began racing him until they had gained a slight leadership, when they would dash by in front across the road or trail, one after the other, frequently the last of the lot being within 20 yards.

"Once the writer tried the experiment when he saw a solitary buck Antelope stand about 100 yards to one side of a wagon road. Appearing not to notice it, he spurred his Horse to full speed across the level plain. The buck immediately whirled and began racing him over the grassy park, gradually drawing in until it finally crossed the trail almost under the Horse's nose and certainly not more than 10 feet away, after which it dashed off and disappeared in the neighbouring scattered growth of cedars.

"On another occasion, after a long hunt, the writer was returning to camp just as it was becoming too dark to distinguish objects at a distance. Camp was some miles away, and in order to get there quickly he was galloping his Horse down the middle of a long, narrow park in the scattered pinyon and cedar forest. He was paying no attention to anything except what lay immediately in front, until a curious sound at his right caused him to look, and there he made out the dim forms of a band of about 20 Antelope which, in a long line about 30 yards away, were racing him down the park. Eventually they gained sufficient headway to cross his course a short dis-

tance in front, when they disappeared. It was so dark at the time that their forms could be only dimly seen."

Jumping Power

All travellers and hunters agree that the Antelope can cover an astounding distance in a single leap; but none of them tell us what they mean by "astounding"—whether 15 feet or 50; and this still remains to be ascertained. Judge Caton[61] was of the opinion that their leaping power is almost restricted to the horizontal. They are so essentially creatures of the open plains, and so unaccustomed to high jumping, that a 4-foot fence was found enough to confine them. This, however, only proves that his experience was limited, and the Antelope he handled were unsophisticated. For fences throughout the West have developed new habits in several species.

Thus, H. P. C., writing from Denver, Colo., Feb. 22, 1910, says that two years previously, while they were after Coyotes, they came upon a large buck Antelope. "The Dogs rushed forward to attack it, and it easily cleared a 5-strand wire fence."[62]

Joseph J. Hall, of Denver, writes: "High jumping is one of the arts that Antelope have not mastered. Although I once witnessed a band of 4 clear a 3-wire fence, I am satisfied that this particular case was the exception; and by examination, I found that the wires were quite low, and closer together than usual. This is, indeed, the only case I know of where Antelope went over a 3-wire fence. Usually, they double up their legs and shoot through between the two upper wires. Their skill in this performance is remarkable. Harold J. Cook, of Agate, Nebraska, who is not only an authority on Antelope, but a careful scientist, corroborates this in every particular."[63]

There are, however, many observations to show that once the Antelope gets accustomed to fences, its marvellous agility is properly applied, and it leaps like a Deer.

There was a time also when the Antelope had no notion of crawling through a wire fence. Thus, in 1907, on May 7th, between Kinnivie and Gleichen, Alta., I saw 26 bands of Antelope (a total of 232) lodged against the new wire fence of the C. P. R. The fence was of three wires only, yet the Antelope knew not how to pass it. They were then moving north. All I saw were on the south side of the fence.

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[61]Ant. & Deer, pp. 47–48.
[62]Forest & Stream, March 5, 1910, p. 372.
[63]Letter, March 23, 1926.

Since then, they have become expert both at crawling through and leaping over. Enos A. Mills describes some Antelope that had strayed into the forest, "hurdling fallen trees as readily as any Deer or Mountain Sheep that I have ever seen."[64] And the Antelope whose capture is narrated by Brunner[65] escaped by leaping over a 5-foot fence.

His Remarkable Feet

The Prongbuck is the only horned ruminant in North America that has but two hoofs on each foot. According to Prince Maximilian,[66] "a trace of one (never two together) of these false hoofs is sometimes seen in the fore feet."

Nature's economic plan has been to remove all parts that cease to be of use, and so save the expense of growing and maintaining them. Thus, man is losing his back or wisdom teeth, since civilized diet is rendering them superfluous.

Ancestors of the Antelope had four hoofs to the foot, like the Deer or the Pig, but the back pair on each have been dropped. At an earlier period, the common ancestor of the Antelope and Deer had *five* well-developed toes on each extremity; but it seems that, while this makes an admirable foot for wading in treacherous swamps, it is, for mechanical reasons, *a slow foot;* the fewer the toes, the greater the speed. The Deer, living in swamps, could not afford to dispense with the useful little hind or mud hoofs, and retained them for bog use; although much modified from the original equal-toed type, more nearly shown in the Pig.

But the Antelope, living on the hard, dry uplands, had no use for bog-trotters, and exchanged them for a higher rate of speed; so that it now has only two toes on each foot.

The Horse family went yet farther. They shunned the very neighbourhood of swamps; all their life was spent on the firm, dry level country. Speed and sound feet were their holds on existence; and these they maintained at their highest pitch by adopting a foot with a single hoof-clad toe.

The Voice

The sound oftenest heard from the Antelope is a querulous, grunting bleat, uttered by the mother when she is calling to the kid. The adult has further a sort of shrill whistle or snort, used as an alarm; also a short

[64] Watched, p. 188.

[65] See Strange Instances later.

[66] Wagner, Suppl. Schreber, V, 1855, p. 461.

bark of curiosity. But most of their signalling is done by appeals to the eye and nose. The kid utters a bleat or squeak.

The Eye

The eye of the Antelope is of marvellous beauty and magnitude, "larger than that of any other quadruped of its size," as Caton says.[67] And there is every evidence that it is as keen as it is beautiful. This is readily understood in relation to the fact that the Antelope is a creature of the open, where its eyes are more often serviceable to it than are its ears—or even its nose; and that the majority of its signals, unlike those of woodland animals, are dependent upon vision for their success.

G. B. Grinnell says of the species: "Of all animals, it is the most keen-sighted, depending almost wholly on its eyes for protection from its enemies. Not that it cannot smell. Its nose is as good as that of any hoofed beast, and will warn it of danger if the hunter neglects the wind. But it is upon its keen eyesight that the Antelope especially depends. If the hunter has been seen, even though at a considerable distance, it is hopeless for him to attempt to approach the Antelope; for as soon as he has passed out of sight, they swiftly change their place to the top of some hill half a mile away, and watch for his reappearance."[68]

Arthur W. du Bray, discoursing on the Antelope's amazing power of vision, says:

"'Liver-eating Johnson,' guide, scout, hunter and trapper, prairie-man, Indian-fighter, thoroughly educated and equipped frontiersman at every point, graduate at the head of his class in prairie lore—withal, a long-headed, cool, and calculating man—once said to me while hunting: 'What a live Antelope don't see between dawn and dark, isn't visible from his standpoint; and while you're a-gawkin' at him through that 'ere glass to make out whether he's a rock or a Goat, he's a-countin' your cartridges and fixin's, and makin' up his mind which way he'll scoot when you disappear in the draw for to sneak on 'im—and don't you ferget it.'"[69]

In giving detailed instructions for pursuing the fourlegged bird, du Bray says: "The principal thing is to keep out of sight. Don't delude yourself with the idea that because a band is a couple of miles away, apparently feeding, and all with their heads down, none are on the lookout, and that you may ride up a little closer and then keep out of sight. That won't do; I know it to my sorrow. The chances are ten to one that they will

[67]Ant. & Deer, p. 24.
[68]When Antelope, p. 600.
[69]Big Game of N. A., 1890, p. 316.

see you long before you see them, and although they may not move at first, still they are on the *qui vive*, and if you get a close shot after having shown yourself, why, just score it down as luck."[70]

In a word, all old-timers agree that it is a physical impossibility to stalk an Antelope once he has seen you; and he certainly will see you if you are in the open within a mile of those dark beautiful orbs.

Curiosity

It is generally believed that the Antelope would have swarmed on the unfenced plains as numerous as ever but for their fatal curiosity—the one weakness that offsets the safety of their matchless speed and eagle eyesight.

In the old days of Lewis and Clark, the recognized method of "tolling" Antelope within shot was to wave a handkerchief on a stick in their plain view, the gunner himself remaining concealed; and usually, after much doubt and many circlings, the herd, urged by their uncontrollable curiosity, ventured within range.

"If," says Grinnell, "the Antelope of the old times had been satisfied with what his eyes told him about his enemies, he might have survived much longer in the prairie country; but, although depending so much on his vision for safety, he was often quite unwilling to accept the story that his eyes told him; he often wanted to come back and take another look, to make sure that it was really an enemy that he had seen; and so after having started off and gone well out of harm's way, he would stop, look again, run off a little farther, and then stop for another look, and then perhaps come galloping back toward the half-concealed object which had alarmed him; until at one of his pauses to look again, the fatal bullet cut short his life."[71]

But that was in the days of yore. When the thunder of Buffalo hoofs was replaced by the rattle of repeating rifles, a new thought came to dominate. Now "if startled by the approach of an enemy, he would race off to the top of the nearest hill, and stand there, stamping and snorting, until his fears overcame his curiosity, and led him to shift his position to some other safer point of observation."[72]

In early days, we are told by many travellers, any unusual object was enough to attract the Antelope. But in later times, they learned wisdom. On the plains of New Mexico, I never could "toll" Antelope, nor did I hear of any one in that country who had succeeded recently. In fact, the local

[70]Big Game of N. A., 1890, p. 317.
[71]When Antelope, p. 600.
[72]As above, p. 601.

hunters maintained that it was "played out"—the Antelope were too wary now to be taken in.

Colonel Roosevelt makes a similar observation for the Antelope of the Little Missouri region. He says:[73] "In the old days, it was often possible to lure them toward the hunter by waving a red handkerchief to and fro on a stick, or even by lying on one's back and kicking the legs. Nowadays, however, there are very few localities indeed in which they are sufficiently unsophisticated to make it worth while trying these time-honoured tricks of the long-vanished trappers and hunters."

An exception to this is furnished by Nelson:[74]

A New Ruse

While collecting specimens in Chihuahua, Mex., some years ago, Dr. E. W. Nelson found Antelope in numbers. He greatly desired one, as it was believed to be of an undescribed race. But they were so shy that he failed for long to get one by ordinary methods. Then, remembering the old stories of the creature's curiosity, he draped himself in a white bedsheet, stuck his hatband full of long grasses, and rode forth.

"Covered with this white cloak," says Nelson, "the writer rode out on the plains until he located a band of Antelope, and when at a distance of nearly half a mile, dismounted, hobbled his Horse, and proceeded toward them in a stooping posture. Meanwhile they were standing looking fixedly at him. When he came within 500 yards he went on his hands and knees, the sheet covering him to the ground, and began moving slowly toward them. The Antelope had lined up, with a large buck standing in front. They turned several times and nervously ran a short distance and then turned and raced back to their first position, where they lined up to look at the strange object.

"The old buck of the band, which from the beginning had stood out by itself in front, began slowly walking toward him. The writer then stopped and sat with crossed legs, the cloak still hiding his person, and waited, rifle in hand, until the buck had come within 100 yards, when it became a prize for the Bureau's Scientific Collection."

Others were secured by the same stratagem and Doctor Nelson adds:

"It may be of interest to know that the specimens of Antelope secured by the use of this grotesque disguise formed the basis of Doctor Merriam's description of a new geographic race of the Pronghorn, which he named *Antilocapra americana mexicana*."

[73] Deer Family, 1903, p. 106.

[74] Pronghorn, pp. 5–6.

Food

The Antelope is a creature of the dry plains, the land of grass, cactus, and sage; and its food is, by long habit, nearly confined to these species of plants. Judge Caton could not induce his captive specimens to touch twigs, browse, or leaves. They would eat grain and fresh bread, but rejected fruit and acorns. "They are fond of common salt," he says,[75] "and should have it always by them when in parks; and if soda be mixed with it, no doubt, it would be better for them, for their native plains generally abound with crude or sulphate of sodium, and long use may make this better for them than in the form of the chloride; at least it is worth the trial by those who have pet Antelopes."

Mills says:[76] "The food of the Pronghorn is sage, grease-wood, sometimes cactus, and, on the desert broomrape. I do not recall ever seeing him eat grass."

E. R. Sans, of the Biological Survey in Nevada, captured and reared successfully some 40 young Antelope in the spring of 1924. At first they were fed on "rich cow's milk, about $\frac{2}{3}$ of a pint at a feeding, heated to a little more than the body temperature, and fed from a bottle through a nipple . . . three times a day. When the fawns were 6 weeks old, we began to feed then a little wheat (bran and middlings)." Later they ate steam-rolled oats and green food from the meadows. At 3 months, they were fond of blue grass and white clover, fresh cut. For winter diet, well-cured meadow hay and rolled oats are best. Green alfalfa is dangerous.[77]

This helpful account disposes of the idea that the Antelope do not eat grass.

They feed freely on many species of cactus; and it will be seen that these amazing flowers of the desert supply not only food, but also drink to a host of dwellers on the burning sands.

C. J. Blazier says: "They will eat most any kind of weeds. They are very fond of peppermint, smartweed and wild rose bush, and around sand dunes, there are lots of things they like that I don't know the names of."

Another authority in the same Bulletin says: "I found that they ate a good deal of sage, but that greasewood was their favourite food."[78]

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[75]Ant. & Deer, p. 42.
[76]Watched, p. 182.
[77]From Nelson's Pronghorn, pp. 19–20.
[78]Report Amer. Bison Soc., 1922–23, p. 47.

Drink

The Antelope, like the Deer and Sheep, have greatly varied habits to fit the opportunities of their wide range.

In the great rainfall region that extends from the lower Saskatchewan to Mexico east of the Rockies, it is the custom of the Antelope band to wend its way once each day during the hours of sun heat to some familiar pond, spring or stream; always at the most open part of it, and always after the utmost circumspection. For they know right well that here may be lying in wait some one of the many foes whose only offset to their speed is ambush.

Here they drink copiously.

Nevertheless, we are confronted also by the fact that Antelope, as well as Deer, are abundant and thrifty in the vast arid area that extends west of the Rockies and east of the Coast ranges from Oregon to Sonora. Large parts of this area are without water during the greater part of the year. How, then, do the Antelope live there? The answer is simple: These regions are provided with vegetation that has the power of storing up water for its own use—that can, during the few showers of winter, lay up enough moisture to carry it over the whole year; and chief among these provident plants are the great bulging cactuses. Each is a living tank charged with fluid so precious that it must perforce wear a bodyguard of poisonous bayonets to keep back the horde of wayfarers so ready to slake their thirst at the cactus's expense. In these, the Antelope finds its desert springs. T. S. Van Dyke, who first called my attention to this fact, said in conversation (1899):

"On the arid plains of Lerdo, in Mexico, where I hunted in 1884, the Deer and Antelope *do not drink*. The proof is conclusive to my mind. I know that the only water for 40 miles was a little pool less than 200 feet across, that was only a quarter of a mile from my camp. Whitetail, Mule-deer, and Antelope abounded in all that region; yet the mud on the banks never showed a sign of one coming there to drink. It seems that the fleshy leaves of the abundant cactus supply them with both food and drink."

E. H. Wuerpel, the well-known artist of St. Louis, writes me similarly, March 30, 1901:

"When I lived in Mexico, six years ago, Antelope were still abundant on the upland plains as far south as Coahuila. There is no water in the region they inhabit, but they find the cactus leaves supply enough moisture."

But what about the spines that are supposed to be the sufficient defense of these vegetable cisterns? Wuerpel writes further: "While crossing the region with oxen, we used to burn the spines off the cactus and feed it to

the Cattle; and they suffered no inconvenience for lack of water, although without it for perhaps two days at a time."

But how do the Antelope utilize them without the kindly help of the fire-maker? Some interesting light on this point has been supplied me by G. B. Winton, of Nashville, Tenn., who points out that not only cactus is eaten, but also numerous other species of desert plants that store up water in their tissues. He says:

"It is the broad nopal leaves, as the Mexicans call them, from which the spines are burned, that the Cattle may eat them in comfort. But range Cattle that eat them, 'raw so,' that they slabber and shed tears over the spines, but get them down somehow. Occasionally, the spines collect in the stomach of an ox in large densely packed balls, ultimately proving fatal. I have seen these queer mementoes of the sufferings of the poor beasts, three inches or more in diameter.

"But there are many other succulent plants besides the prickly pear, and there are many species of the *opuntia* in Mexico, not less than 100, I should think. Some of these have almost no spines on the leaves. Others have the tufts of spines so wide apart that a Goat or a Deer may insert his muzzle between, and get a good bite, though a Cow could not. Others have soft spines, especially when the leaf is new.

"But in the arid region, the soil contains so little moisture that most of the plants have to have facilities for collecting it from the air. Their leaves or stems or both are soft and spongy. Besides the *opuntia*, there is another large family of cactus, the *mammilaria-viznagas*, in Spanish, some of them the size of a fist or smaller, others as big as barrels, protected by thorns too; but not so as to make it impossible for an animal to gnaw them. This form of cactus is very abundant about San Luis Potosi, and seems to be much depended on by both wild and domestic animals as an article of food. Then there is the organ cactus in several varieties, of some of which the fruit is especially abundant and succulent. One form, kin to the giant cactus of Arizona, has a delicious little apple, *pitaya*, of which Deer especially are excessively fond.

"But besides the cactuses—and I have enumerated by no means all of them—there is the large agave family, the maguey or century plant, the soap-root (*lechuguilla*), etc., etc., and the yuccas. All contain a surprisingly large proportion of water; and while usually thorny, are not as spiny as the cactus. Deer feed extensively on *lechuguilla*, a dwarf agave, the root of which is an excellent substitute for soap. As to the fruit of many of these plants, it is to be remembered that the climate of the Mexican Plateau is so even that cactus apples, *garambuya* berries, etc., come along without much

reference to season; there being rarely a time when something of the kind is not to be had.

"In spite of all this, however, it used always to give me a sort of uncanny feeling to find the Deer and other animals, fat and contented, making their habitat in some sun-scorched range of hills so dry that it almost frightened a man to camp among them, even though he carried and very carefully hoarded a good supply of water for his own use. How do they do it?

"Well the explanation given is the only possible one—they eat moist food. For be it understood that they do not eat cactus, etc., simply for water; it is a principal article of their diet. There must be, too, something of gradual adaptation. Goats on the range in Mexico, in ordinary weather, are taken to water only twice a week. The Deer, through many generations of practice, have got to the point where they scarcely go at all; though if water is convenient, and the weather hot, they will drink."[79]

Francis C. Nicholas, writing of the animals living in rainless Sonora, says: "A prominent physician, Doctor Purdy, of Nogales, Arizona, visited the neutral zone above Tiburon Island; and, becoming impressed with the evident ability of the animals of that region to sustain life with a minimum of water, made a series of dissections, and found that, in all instances, the bladders of the animals were abnormally small. This condition, he reports, was most pronounced among the Antelopes; and it was found in most instances that the bladders were so small that they would not have held twenty drops of water."[80]

The Enemies of the Pronghorn

The worst enemies of the wild Antelope to-day are, first, repeating rifles; next, Sheep, which destroy their winter range; and, finally, deep snow. But Coyotes, Wolves, and eagles kill many, especially kids; and epidemic diseases occasionally appear.

Coyotes are to be feared chiefly when so hard pressed by hunger that they organize a hunt with a system of relays, and thus run down the quarry that is so much swifter than themselves. This is fully set forth in the Coyote Life. But they kill numbers of the little ones before they are able to follow the mother.

Gray-wolves are less destructive because less numerous. The same remark applies to eagles. Details of the winter death and of plague, also of attacks by Coyotes and eagles, are offered later.

[79]Personal letter, July 5, 1906.

[80]Forest & Stream, Jan. 17, 1914, p. 70.

It is well worth considering the part that the Buffalo played in protecting the Antelope from Coyotes and Wolves, as well as may be from weather. As we shall see, the Pronghorn commonly associates to-day with Horses and Cattle, and even flies to them for refuge. There can be little doubt that, so confiding themselves to Buffalo, would be most effectual safety; not because of the Buffalo's friendship for the Pronghorn, but because of the Buffalo's animosity to Coyote and Wolf.

The rapid disappearance of Antelope at the same time as the Buffalo, may be more than a mere coincidence.

Rufus B. Sage describes[81] the Antelope and the Buffalo wintering together in vast throngs near Pike's Peak in 1842.

The Enemy—Snow

Every observer who has discussed the subject, tells us that in the northern part of the range, the most dreaded enemy of the Antelope is deep snow—snow that robs them of their food and of their speed, and drives the Wolves and Coyotes crazy with hunger.

Grinnell writes:[82] "Sometimes in winter, during the cold wet storms, the coats of the Antelope would become covered with wet snow, which afterward froze to them; and the animals might become so chilled that they were unable to run, and could sometimes be knocked on the head with a club."

Dr. E. L. Munson, writing from Fort Assiniboine, Mont., says:[83] "Mr. Parotti has been in this country as hunter and guide for nearly 20 years. He tells me that the fearful winter of 1893, when the thermometer registered 61 degrees below in this post, killed off four fifths of the Antelope—that they starved to death by thousands on account of the deep snow. He found, after that winter, what he estimated were 900 carcasses where the Antelope had drifted into a deep ravine and evidently had no strength to get out. Before that time, Antelope were plenty through here, but that winter killed nearly all off. While they were shot by thousands, the number so destroyed was only an insignificant fraction of the total."

These were winters of unusual severity, but they came in cycles, and took a fearful toll. Charles Blazier, the Antelope expert of Brooks, Alta., says:[84]

"The last of the big herds that used to be seen, even after the Province started settling up, went south in the winter of 1906–07, the original year

[81] Rocky Mt. Life, pp. 288, 290.
[82] When Antelope, p. 600.
[83] Forest & Stream, March 27, 1897, p. 244.
[84] Daily Colonist, Victoria, Jan, 25, 1925, p. 30.

of the 'blue snow.' They started south with a blizzard behind them, and just kept going. Lots of them died on the way, and the rest never did come back in large nunbers. . . .

"You can't stop an Antelope when it gets settled on going anyplace; might as well not try. I've seen them swimming the Red Deer River by thousands in the spring, when the ice was still floating down. Most of them were drowned, and those that managed to get across were killed by half-breeds; but still they kept on trying to cross."

Again, the Bulletin of the American Game Protective Association in its issue for Nov. (?), 1921, p. 5, asserts that the previous year, one third of the Antelope in Yellowstone Park were winter-killed.

Another dreaded result of these conditions is indicated in the report on the Antelope herds in the Wind Cave Game Preserve on the National Bison Range in Montana. In fair weather, these, thanks to their speed, could scoff at the various beasts of prey. But "during severe winter storms in two seasons, the band of 64 Antelope on the Bison Range was completely destroyed by wandering predatory animals, which were able to drive them into snow drifts and kill them without difficulty. More than half the herd on the Wind Cave Refuge also was killed, partly by Coyotes and partly by Bobcats."[85]

Disease

Domesticated Antelope in parks are very subject to fatal enteritis, a consequence, no doubt, of improper food. But the wild Antelope also have visitations of deadly disorders. Concerning the most destructive of those on record, Dr. J. A. Allen says:[86]

"During the summer of 1873, a fatal epidemic raged among the Pronghorns over nearly the whole area between the Yellowstone and Missouri Rivers, destroying apparently three fourths to nine tenths of them. The greatest fatality seems to have occurred in July, judging from the size of the fawns found dead, and hence not long after we crossed this portion of the country. From the head of Heart River to the Missouri, we found their carcasses, on our return, thickly scattered along our line of march, including those of both sexes and all ages; fawns being often found lying within a few yards of their dams. On our way out, Antelopes were almost constantly in sight; but on our return, they were only rarely met with, ten dead ones being seen to each living one. The epidemic seems not to have extended beyond the Yellowstone, where they seemed more numer-

[85]Pronghorn, p. 17.

[86]Nat. Hist. Mont. & Dak., June, 1874, p. 40.

ous on our return than on our way out, and where no dead ones were observed.

"The previous year, they are reported to have ranged over this section of the country, in autumn, in very large numbers, bands of 200 or 300 being sometimes met with by the Yellowstone Expedition of 1872, on its return eastward. Four were captured by the men as the frightened animals attempted to run through the train.

"Epidemics similar to that affecting the Pronghorns are well known to occasionally affect Deer, Rabbits, and Field-mice."

Antelope and Eagle

As we shall see in the section dealing with the young, the golden eagle or war-eagle commonly preys on the kids. But it goes even farther, and at times makes successful attacks on the full-grown Pronghorns.

The first case I ever heard of was reported to me by Harry J. Wells, ranchman of Clayton, N. M. In the autumn round-up, he said, he had seen a pair of eagles attack and kill a full-grown Antelope.

Roosevelt, discussing the subject, says: "A neighbouring ranchman informs me that he was once an eye-witness to such an attack. It was a bleak day in the late winter, and he was riding home across a wide dreary plateau, when he saw two eagles worrying and pouncing on a Pronghorn—seemingly a yearling. It made a gallant fight. The eagles hovered over it with spread wings, now and then swooping down, their talons out-thrust, to strike at the head, or to try to settle on the loins. The Antelope reared and struck with hoofs and horns like a Goat; but its strength was failing rapidly, and doubtless it would have succumbed in the end had not the approach of the ranchman driven off the marauders."[87]

Another detailed case is given by L. B. Storer in his article, "A Feathered Hunter."[88] Storer was hunting in the winter of 1880 in southwestern Nebraska. He was lying in wait for a band of 8 Antelope. He says:

"The animals finally approached within 300 yards of me when they suddenly bunched and started on a run in the direction whence they had come. They ran some distance before I discovered the cause of the stampede. Then I saw, about 10 feet behind and about the same distance above them, an eagle. For half a mile he pursued them, maintaining his position perfectly, and I could not see that he varied an inch. The Antelope were just touching the high places and were getting far away; but,

[87] Wilderness Hunter, 1893, p. 71.

[88] Recreation, June, 1902, p. 413.

PLATE LXIV.—LEAVING THE GREYHOUNDS BEHIND

Drawing originally published in *Recreation*

PLATE LXV.—YOUNG ANTELOPE, FROM LIFE

(*Antilocapra americana* (Ord))

Sept., 1885

watching them through my field glass, I saw the eagle swoop. One Antelope left the band; the great bird followed it, and for a moment both disappeared from sight. Then they emerged from the swale and started up the opposite ridge. The eagle had gained on his prey until now he was directly over the poor beast. The race was neck and neck, with the odds all in favour of the cruel bird.

"Finally he folded his wings and dropped like a chunk of lead on the Antelope's neck. The latter fell, apparently stunned by the blow. Then there was a struggle, during which the terror-stricken quarry several times rose to its feet; but the bird's talons were sunk deep in its neck and the life blood was flowing rapidly. The great bird pounded the Antelope with his mighty wings, and apparently blinded it."

Mating

The ideal family gathering is broken up at length, not by any outside enemy, but by the annual mating (one cannot call it pairing) season. Toward the end of September, the kids of the year are weaned; and about the same time, the procreative instinct is aroused in the bucks. At first the feeling is one merely of fevered unrest without definite purpose; sudden impulses drive them to expend their energies in aimless exercise. The Honourable Theodore Roosevelt writes:[89]

"Of all the game, the Prongbuck seems to me the most excitable during the rut. The males run the does much as do the bucks of the Mule and Whitetail Deer. If there are no does present, I have sometimes watched a buck run to and fro by himself. The first time I saw this, I was greatly interested, and could form no idea of what the buck was doing. He was by a creek bed in a slight depression or shallow valley, and was grazing uneasily. After a little while he suddenly started and ran just as hard as he could, off in a straight direction, nearly away from me. I thought that somehow or other he had discovered my presence; but he suddenly wheeled and came back to the original place, still running at his utmost speed. Then he halted, moved about with the white hairs on his rump outspread, and again dashed off at full speed, halted, wheeled, and came back. Two or three times he did this, and let me get up very close to him before he discovered me. I was too much interested in what he was doing to desire to shoot him."

The passion of the bucks takes very definite form when, later, the females manifest signs of response; and the battles that ensue show all the

[89]Deer Family, pp. 109–10.

savagery and greed that is characteristic of the extremely polygamous creature that the Antelope is. Canfield says[90] of his domesticated Antelope: "He was the most salacious animal I have ever seen."

"In September," says Roosevelt,[91] "sometimes not earlier than October, the big bucks begin to gather the does into harems. Each buck is then constantly on the watch to protect his harem from outsiders, and steal another doe, if he can get a chance. I have seen a comparatively young buck who had appropriated a doe, hustle her hastily out of the country as soon as he saw another Antelope in the neighbourhood, while, on the other hand, a big buck, already with a good herd of does, will do his best to appropriate any other that comes in sight."

Fighting

Roosevelt does not think these buck duels very serious affairs; but Audubon says[92] they "fight with great courage and even a degree of ferocity. . . . They strike with their horns, they wheel and bound with prodigious activity and rapidity, giving and receiving severe wounds."

In the Washington Zoo, I repeatedly saw their manner of fighting; and was made to realize how exactly each detail of the apparently harmless horn had a purpose, offensive or defensive, for which it was highly specialized. Two bucks were having one of their periodical struggles for the mastery. They approached each other with noses to the ground; and, after fencing for an opening, closed with a clash. As they thrust and parried, the purpose of the prong was clear. It served the Antelope exactly as the guard on the bowie knife or the sword serves a man; for countless thrusts that would have slipped up the horn and reached the head, were caught with admirable adroitness in this fork.

And the inturned harmless-looking points? I had to watch long before I saw how dangerous they might be when skilfully used. After several minutes of fencing, one of the bucks got under his rival's guard; and making a sudden lunge, which the other failed to catch in the fork, he brought his inturned left point to bear on the unprotected throat of his opponent, who saved himself from injury by rearing quickly, and throwing himself backward. Such a move, however, it seemed to me, could scarcely have foiled a dangerous thrust if the two animals had been fighting a deadly duel.

I find, further, that in their fights, the wild Antelope are usually struck

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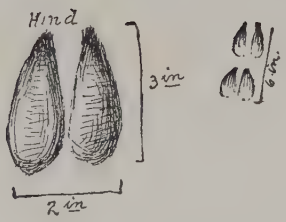
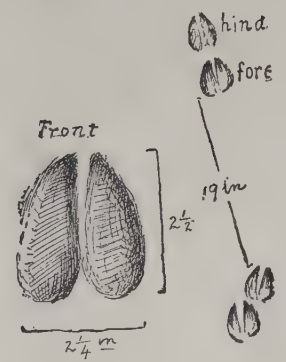
[90] Caton, Ant. & Deer. pp. 45–46.
[91] Deer Family, p. 110.
[92] Q. N. A., II, p. 197.

An Antelope pose

Antelope poses

Antelope poses





Tracks of large Antelope

PLATE LXIX.—ANTELOPE POSES AND TRACKS

in this way. W. R. McFadden tells me that on two occasions, he has seen a buck badly ripped by a rival's horn—one in the throat, the other in the side of the neck close to the throat.

The Coming of the Young

Early in the spring the usual inevitable disposition to scatter, manifests itself. The separation of the sexes seems to be due to an instinctive dislike of each other, as the time approaches for the young to be born. It becomes yet stronger as the hour draws near. At that time, each female strives to be utterly alone. She avoids even the few remaining companions of her own sex, and retires to some secluded spot.

Parturition takes place in late May or early June, on the Yellowstone, but may be earlier farther south. The fawns or kids are commonly 2 in number, rarely 3. Their mother hides them close together for several days, visiting them at frequent intervals, ceaselessly scanning air and plain for signs of danger, and never going far away, except, perhaps, when forced to seek water—a necessary absence which she cuts as short as possible.

The description of securing the kids, as given by James M. Floyd, furnishes a good idea of mother and young at this time. From the top of a butte in the Great Nevada Desert, a Federal game warden had kept daily watch on a big band of the floating white blots that stood for Antelope. Then in May, "the watcher, who for two weeks had followed the herd with his glasses, hiding here and there, knew that in a few days the does would begin dropping kids in large numbers; and twelve men were called and stationed at points along the feeding grounds where the animals assembled annually to bring forth their young.

"A truck skirted the edge of the Desert, and the driver distributed small crates to points a few miles apart; and near these, men were stationed to watch the herd day and night.

"Two days after the vigil was established, the first capture was made. Coming out from the ranks, a doe heavy in fold, approached within a few hundred yards of two men on watch. So closely did she resemble the desert that only keen eyes could perceive her. She dropped a kid, nosed the animal a moment; and there in the hot sun, he stretched out, resembling a tiny sand mound. As the mother went to another point to drop a second kid, several hundred yards away, the hunters stole from their hiding place, and keeping their eyes glued closely on the tiny sand mound, soon caught and carried off the kid, and placed him in a crate.

"Later in the day, hunters on the other side of the desert made a similar

capture. It was done noiselessly and without incident, and only one kid was taken from each mother.

"Day by day for two weeks the hunters worked, capturing sometimes two and sometimes three a day or more, and sending them to a ranch house to be fed on a bottle."[93]

Commenting on the young in Alberta, Charles Blazier says:[94] "The fawns generally come in April and May. . . . After the first fawn is born, you will see the doe turn round and 'speak' to it. Well, you'd swear that she did speak, for that little fawn just trots away and hides.

"There is no scent on the new-born animals, so when you go out with a Dog, you have to see the fawn. So well can they hide that often you will get quite close without seeing them. When they are very young, I can catch them myself. But as soon as they are a few days old, they can run and you have to put a Dog on them. The Dog is muzzled and his job is to knock them down. When they are captured, we take them back to camp and put them in a temporary corral. . . . You have to catch them within the first ten days. After that, a Dog can't keep up with them. A Dog will kill itself running after them."

The Wise Mother

Blazier continues: "But the doe is smart in looking after her young. She knows they give off no scent and she can smell any attacker. Mr. Coyote comes along and she doesn't get the least excited. She just pretends to go on grazing. She lets him get near. Then she starts running and the Coyote follows. She lets him almost catch her several times and leads him miles away. Then she gets clear of him, and circles back to where she left her young.

"She will not betray their hiding place by going to it, but goes back to feed. Every once in a while she will trot towards the fawns and they seem to know what is wanted, and one of them rises up just enough to let the doe see they are there.

"The only way a Coyote can get them in the open is by coming on one suddenly. Once the Antelope is in stride, the Coyote has no chance."[95]

The Brave Mother

From this we might infer that the mother played only the rôle of wise but timid martyr, devoted but feeble and helpless. It seems not so. At

[93]Forest & Stream, Dec., 1924, p. 745.
[94]Daily Colonist, Victoria, Jan. 25, 1925, p. 30.
[95]As above.

all times, the squeak of a kid will bring her back at reckless speed, with blazing eye and bristling hair, ready to fight to the death any ordinary foe, or (if it be one too strong to fight) to intercept and mislead him, by every device the mother wit can bring to bear. There are not many creatures native to the Plains that she will not face in such a case. As Colonel Roosevelt says:[96] "A doe will fight most gallantly for her fawn, and is an overmatch for a single Coyote; but, of course, she can do little against a large Wolf."

Audubon and Bachman say:[97] "Sometimes, however, the Wolves [Coyotes] discover and attack the young when they are too feeble to escape, and the mother then displays the most devoted courage in their defense. She rushes on them, butting and striking with her short horns, and sometimes tosses a Wolf heels over head. She also uses her fore feet, with which she deals severe blows, and if the Wolves are not in strong force or desperate with hunger, puts them to flight, and then seeks with her young a safer pasturage, or some almost inaccessible rocky hillside."

Grinnell gives us in fuller detail this very situation. He says: "It is a common thing for a Coyote to chase an old doe with her kids just after the little ones have begun to run about. At that time, they are very swift for short distances, but have not the strength to stand a long chase. In such a case, a mother will often stay behind her young, and will try to fight off the Coyote, butting him with her head and striking him with her fore feet. He pays little attention to her, except to snap at her, and keeps on after the kids.

"Several times I have seen a mother Antelope lead her little ones into the midst of a bed of cactus, where the Wolf could not go without getting his feet full of thorns. If the bed is small the Wolf will make ferocious dashes up to its border, trying to frighten the little ones so they will run out on the other side and he can start after them again, but usually the mother has no trouble in holding them. I have several times killed young Antelope whose legs had been bitten up by Coyotes, but which had got away."[98]

The Mother Antelope and the Eagle

But there is an even more dangerous enemy, because of his eyesight and his swiftness. That is the golden eagle. One of the most thrilling episodes in Antelope life is from the pen of my old friend, Howard Eaton, and deals with the attack of an eagle. He writes:

"Along in June, '94, I was out with the men gathering a bunch of

[96]Deer Family, p. 111.
[97]Q. N. A., II, p. 197.
[98]Forest & Stream, Feb. 6, 1897, p. 104.

Horses near Rainy Buttes, in the Bad Lands of North Dakota. Antelope were still plenty, and we saw many does and fawns daily.

"One evening, shortly before sunset, I saw a sight never to be forgotten. Just from habit, I had counted the Antelope we had seen that day, and up to about 6 P.M., had tallied 28. I was riding with one cowboy, and as we swung over the shoulder of a flat butte, we rode into a saucer-shaped hollow about 80 yards in diameter. I saw Antelope Number 29 across the valley, and a little higher up on the butte stood Number 30. Just then the latter spread its wings and sailed off—a big old golden eagle. Number 29 was a sure enough Antelope. She stood gazing at us until the eagle sailed near her. Then, to my surprise, she ran at him, jumped high and struck viciously with her fore leg. I had never seen such a sight before, and rode toward the spot, and watched her chase the eagle as he circled, striking at him whenever he came low. When she struck, the bird sailed higher and circled, never going far away.

"It flashed on me that the eagle wanted fawn for supper. I ran my Horse toward the fight, and when 200 yards away, a fawn raised his head above the grass. When he saw me he tried to jump up, but floundered, so I knew his back was hurt. I was within 50 yards when the eagle made a last swoop at the fawn, but the brave doe got there first, jumped at him and chased him away.

"The poor little fawn tried hard to get up and run, but his back was hurt too badly. When I picked him up, he cried like a baby, the most piteous bleat, and the doe ran to within 20 yards of us. The eagle heard the fawn cry and sailed within easy shotgun range, and the brave little mother chased him again.

"I found the claws of the eagle had lacerated the little fellow's back so wickedly, and especially just over the kidneys, that it would be well-nigh impossible to save his life. It was during the hot weather, and the kid being so young and having so little vitality, inflammation would be sure to set in. I therefore adopted the only humane remedy and put him out of his misery as quickly as possible.

"As we rode away, the poor old doe followed us nearly to the ranch. Then she stood on a hill until we entered the corral. I would gladly have restored her young to her, safe and sound if possible, and would have saved her from any such contest with possible enemies in the future if she could have trusted me; but her fear of her ancient enemy, man, would not permit her to go home with us."[99]

The menace of the eagle is tempered by the fact that eagles are few, and

[99]Recreation, Nov., 1914, pp. 278–79.

other foods abundant. But the coming of the snow somewhat changes this; and in winter, the war-bird takes his toll when easier prey is wanting.

Grinnell writes: "The golden eagles often kill them when they are quite young, although if any old ones are near they will fight the birds, keeping them from catching the young ones.

"Once in winter I saw an eagle attack two kids. They were feeding at a little distance from a large bunch of perhaps 1,000 Antelope. At this time the young ones were 7 or 8 months old, and so quite large and strong. The eagle had been sitting somewhere on the hillside, and flew down over the kids to pounce on one of them. They immediately began to run to the herd, and when the eagle made a dart at them, they both stopped, reared on the hind legs, a good deal in the position of the unicorn that we sometimes see fighting for the crown, and struck at the bird with their fore feet. Perhaps he was not very hungry, but at all events this turned him and the kids ran on. He made two more swoops at them before they reached the herd, and each time they fought him off in the same way by rearing up and striking after him. Of course, when they got in among the other Antelope, the eagle left them and flew away."[100]

The Kid Lays Low

Audubon, during his visit to the Far West in 1843, had many opportunities of observing the young after they were old enough to follow the mother. This they do, he says, when they are a fortnight old; and he describes with happy enthusiasm the nursing of a kid at this age:[101]

"We had the gratification of seeing an old female, in a flock of eight or ten Antelope, suckling its young. The little beauty performed this operation precisely in the manner of our common lambs; almost kneeling down, bending its head upward, its rump elevated, it thumped the bag of its mother from time to time, and reminded us of far distant scenes where peaceful flocks feed and repose under the safeguard of our race."

The kids, though strong enough to follow the mother, are yet ready, at her signal, to hide when danger threatens; and the marvellous way in which they "play dead" is most inspiring.

On June 13, 1897, I rode to the top of Junction Butte, in Yellowstone Park. As my head rose above the level, I caught sight of a female Antelope walking along, followed by a smaller animal, that turned out to be her kid. Very soon the mother saw me, and communicated her alarm to the young one, which dropped at once to the ground. Just how she ordered him to

[100]Forest & Stream, Feb. 6, 1897, p. 104.

[101]Q. N. A., II, p. 199.

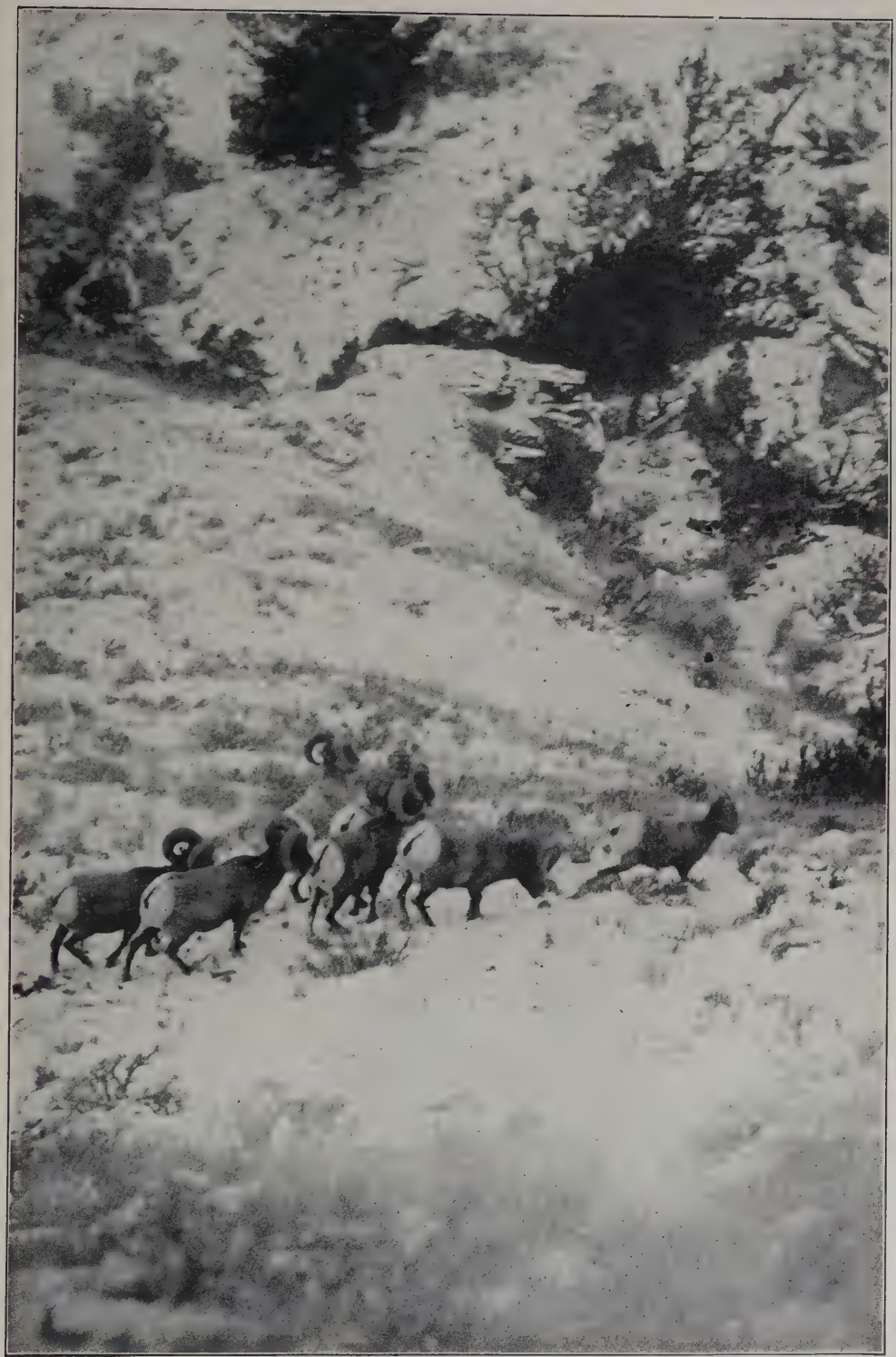


PLATE LXXVIII.—THEIR WINTER HOMELAND, YELLOWSTONE

Photograph by E. T. Seton

PLATE LXXIX.—THE RAM HERD OF YELLOWSTONE PARK

Photographs by E. T. Seton, Jan., 1914

Antelope with drooping horns

From photograph in *Recreation*, June, 1897, by W. H. R. who got them at Laramie, Wyo., in 1893

Diagram of buck Antelope's horns in his four successive autumns

The black part is the new horn coming inside

Skin of crupper-discs

At AA the hair was about 4 inches long; at and below BB less than 2 inches; at CCC, between the two patches, it was ½ inch long

PLATE LXX.—ANTELOPE DETAILS

hide I cannot tell. I am satisfied that he did not see the danger. She may have grunted, but I am inclined to think that the danger signal was a flash of her crupper-disks. As soon as he had dropped, she ran off to one side, uttering the loud, grunting bleat of the species. Evidently, she was trying to decoy me away; but I rode straight to where the young one had disappeared, and found him crouching flat on the bare ground, and yet so well concealed by his protective colour and his stillness, that had I not marked him down, I never should have found him. I rode around him, and spent some twenty minutes making the sketch, which, finished afterward, appears herewith, Plate LXVIII. During this time, he gave no sign of life. Even a fly crawling over his eye and nose did not make him forget that his duty was to "lay low" at whatever cost.

This young one I took to be two weeks old. His colours were quite unlike those of the adult, being soft, unspotted shades of gray and brown that matched him with the ground, helping him to hide; they constituted, indeed, a *protective* colouration, in contrast to the *directive* livery of the old one—a livery which he does not assume until he is able to save himself by running.

On the preceding day, I had ridden alongside the Yellowstone, in the Park, with Elwood Hofer. Three Antelope were in sight. By imitating the squeal of a kid, Hofer brought an old one up near; and shortly afterward, we found two of the young close together. They were well-grown—much larger than the one seen the day after; yet they crouched in the sage while the mother circled 200 yards away, uttering her alarm bleat. When we got within a few feet of them, they jumped up and ran away swiftly, but crouched again when out of sight over the next ridge. I took them to be about three weeks old. In this case, the mother's alarm cry may have been the sufficient order to hide.

Mills tells thus of certain kids that he was watching: "I stumbled over a lone Antelope kid about half a mile from the other two. I returned later and found that it was entangled between the twisted low-lying limbs of a sage-brush. Not until I laid hold of the kid to drag it out did it make a move. Then it struggled and gave a low bleat.

"Realizing that this might bring the mother like lightning, I let go and rose up. There she was, coming like the wind, and only 400 or 500 feet away, indifferent to the fact that man is the most dangerous of enemies. Just how close she might have come, just what might have happened had I not straightened up at that moment, is sheer guesswork. But the freed youngster butted me violently behind and then ran off to meet his mother."[102]

[102] Watched, pp. 177–78.

It seems indeed likely that few Antelope kids are killed by their natural enemies, except such as are surprised during the brief absences of the devoted mother.

This is a danger inseparable from polygamy. If the Antelope had developed monogamy, the young would have two adults to protect them; at least one would likely be near at all times, and the superior prowess of the buck might even have eliminated the chief danger of their lives.

As soon as the young can follow—that is, at about 3 weeks old—there is a disposition on the part of the mothers to form little bands. In early July, two or three of the old ones with their kids may often be seen together. They unite for the sake of company and mutual protection; so that this is truly a social gathering.

By the end of July, the kids on the Yellowstone are about half grown, and have now assumed the livery of the old ones. Early in August, the young bucks begin to join the bands of their mothers and little brothers.

September Bright and Care-free

By September, older bucks drift in, and the Antelope band shows all ages, sizes, and sexes mingled together in a huge happy family. As this is too soon for the sexual passions to play their firebrand part, we have in this bright month of September an ideal scene that is probably unique among our horned ruminants.

Many old hunters have described it to me. W. R. McFadden, of Denver, in particular, has given me full details, including those of a game that he witnessed about the middle of Sept., 1882, in the head of Middle Park, Colo.

He had crawled out after a band of Antelope on the plain. There was a fine big buck, and only one. McFadden got out to a Buffalo wallow, and rising up to shoot, saw the buck playing with 7 or 8 kids. They were careering about, he was leading. They would chase him, and caper and prance around him. After about half an hour, the little ones got tired, and rested. But the buck was still fresh, and he set out racing by himself as though bent on using up all his surplus energies. Rushing at full gallop round and round the bushes, here and there, anywhere, to keep going, and yet close to the band, he must have run ten minutes, all alone, at full speed, while the hunter watched; and still seemed fresh as ever.

On another occasion, McFadden saw a dozen kids and two or three big bucks at play in the same way.

As September passes, the band increases, the merry games relax not;

and the good fellowship existing is exemplified when Fox or Coyote menace any of the young. Each one seems now to act for the good of the enitre herd. A mid-September incident of Antelope hunting in Jackson Hole recurs to me: I had crawled through brush and sage for half a mile after a mixed band of 40. I was within 300 yards, and in cover of a certain clump of sage. I expected to get within 100 yards, before selecting my specimen, when a loud "kau" afar to my right called my attention to the fact that I was in plain view of a young sentinel buck whose head showed above the sage 200 yards away. In an instant every crupper-disk was flashing and the band lined up. The next moment I knew they would be going. I turned my sights on the nearest—it was the sentinel—and now—he is among the specimens on view in the National Museum.

Winter Life

During the winter the Antelope live in mixed bands of all ages and sizes. Nowadays these bands are commonly 10 to 50 in number; but in earlier days, I am told, several hundred, even thousands, would run together.

And when a dread blizzard comes, it sweeps the Antelope of a thousand square miles before it, into the brake or shelter of the hills, as we have seen in an earlier section.

How Tamable

If captured when fully adult, Antelope are usually irreclaimable. But, taken when a few days old, they are the most tamable of our horned creatures.

They are, however, extremely delicate at this age, and difficult to bring up, although J. H. G. Bray, of Medicine Hat, tells me that he has had good success with them, and reared many Antelope kids by feeding them on cow's milk, one third water, and a little sugar, giving them many feedings a day.

Even when fully grown, they are not hardy, and rarely live long in confinement. Fatal enteritis seems to be the usual cause of death.

Charles Blazier, of Brooks, Alta., has had uniform success in handling these lovely fragile creatures.

Those who have opportunity, and wish to make practical use of directions to capture and raise Antelope kids, are counselled to send for Nelson's Bulletin, No. 1346, U. S. Dept. Agriculture. (See References.) In this are given in detail the successful methods followed by Supervisor E. R. Sans (pp. 18–22).

Odd Associations

It is a common remark out West that Elk and Horses go together. Cattle and Antelope show somewhat similar liking for each other's company.

A case is related later of Antelope and rams of common Sheep associating. But Cattle were their favourites ever, as in ancient days they hung on the flanks of the Buffalo, possibly to enjoy the protection from Wolves as we have seen.

Strange Happenings

Eugene A. Brunner, of Bethlehem, Pa., relates the history of an Antelope caught by hand, as follows:

"In 1877, I worked on the Sheep ranch of Eaton & Gifford, on Cedar Creek, Russell County, Kansas. The Sheep were taken out to graze miles away from the corrals; but the rams were kept separate and were herded nearer home by a young man about 18 years old whose name I do not remember. One fine day in the fall, a ram herd was in plain view about one half a mile from the cook shanty, when suddenly I heard someone yelling. I looked in the direction of the herd and saw the young man waving his coat and calling. At first I thought it was a prairie fire, but seeing no smoke, I was puzzled to know what was wrong.

"I hitched up the mules to the wagon, which was always ready for a prairie fire, with barrels half full of water and old wool sacks to fight the fire; and drove to the ram herd. When I came up to the herder, he was holding an Antelope down. He had tied its legs together, using the lining of his coat for ropes.

"This Antelope, with some others, came to the herd, and being very inquisitive, they went from one ram to the other, trying to make friends. The herder lay on the ground perfectly quiet, and presently one of the Antelopes smelled around him and he seized and held it, tore the lining of his coat to tie the legs—in which he succeeded pretty well—and then yelled for help." She escaped by jumping the 5-foot fence of the corral.[103]

The Right of Sanctuary

A range-rider, J. H. C., living at Lowry, Mont., after mentioning, to condemn severely as "a cruel shame," the practice of using an automobile to run down Antelope, relates the following:

"Recently a farmer living north of the city, was coming to town and stopped to open a gate. While he was doing so, an Antelope, hard-pressed

[103]Forest & Stream, Feb. 19, 1910, p. 293.

by an automobile, ran in between his Horses for protection and was saved by him from its pursuers."[104]

This is in line with several instances that I have seen, as set forth in the Lives of Coyote, Red-fox, Moose, Snowshoe Rabbit, etc.

J. B. Goff told me, Oct. 2, 1901, that while freighting between Rifle and Rawlins some years before, he saw two Coyotes chasing an Antelope. They worked some distance apart, keeping the Antelope running zigzag between them, so that it really did four times the running of either. At last, in utter exhaustion, it ran up to him, and cowered near the Horses for protection. He dropped his lariat on its neck—and—I am sorry to say—well, he said in justification, "I was out of meat."

I was privileged to see a similar case with even more dramatic details. It was in the October of 1898. I was riding across the Bighorn Basin, Wyo., with Mrs. Seton and A. A. Anderson, when we noticed near the horizon some bright white specks. They were moving about, appearing and disappearing. Then two of them seemed to dart erratically over the plain, keeping always an equal distance apart. Soon these left the others, and careered about like twin meteors, this way and that, then our way; at first in changing line, but later directed toward us. Their wonderful speed soon ate up the intervening mile or two, and we now saw clearly that they were Antelope, one in pursuit of the other. High over their heads a golden eagle was sailing.

On they came. The half mile shrank to a couple of hundred yards, and we saw that they were bucks—the hind one the larger—dashing straight toward us. As they yet neared, we could see the smaller one making desperate efforts to avoid the savage lunges of the big one's horns, and barely maintaining the scant six feet that were between him and his foe.

We reined up to watch, for it now was clear that the smaller buck had been defeated in battle, and was trying to save his life by flight. But his heaving flanks and gaping, dribbling mouth showed that he could not hold out much longer. Straight on he came toward us, the deadliest foes of his race, the ones he ordinarily fears the most.

He was clearly between two deaths; which should he choose? He seemed not to hesitate—the 200 yards shrank to 100, the 100 to 50—then the pursuer slackened his speed, seeing that it would be folly to come farther. The fugitive kept on until he dashed right in among our startled Horses. The eagle lighted on a rock 200 yards away.

The victorious buck veered off, shaking his sharp, black horns, and circling at a safe distance around our cavalcade to intercept his victim

[104]Forest & Stream, Jan. 9, 1909, p. 55.

when he should come out the other side. But the victim did not come out. He felt that he was saved, and he stayed with us. The other buck, seeing that he was baulked, gave up the attempt; and turning back, sailed across the plain, till he became a white speck that rejoined the other specks—no doubt the does that had caused the duel.

The vanquished buck with us stood for a time panting, lolling his tongue, and showing every sign of dire distress. It would have been easy to lasso him, but none of us had any desire to do him harm. In a very short time he regained his wind, and having seen his foe away to a safe distance, he left our company and went off in the opposite direction. The eagle, realizing now that there would be no pickings for him, rose in haste and soared away.

This incident suggests a number of psychological problems which will be hard to solve if we accept certain old-time theories of animal creation; but which will solve themselves if we admit the Antelope to be a fellow-creature, with feelings somewhat akin to our own. Had one of us been in the place of the vanquished buck, we should probably have done just as he did.

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White Goat, Rocky Mountain Goat, American Chamois, Goat-Antelope, Antelope-Goat, Wool-Bearing Antelope, White Buffalo, White Antelope, The Old-Man-of-the-Mountains, Mazama

Oreamnos americanus (Blainville)

(Gr. *oreos*, of a mountain and *amnos*, a lamb; L. *americanus*, of America)

Rupicapra americana Blainville, 1816, Bull. Sci. Soc. Philomath, Paris, p. 80.

Oreamnos americanus Hollister, 1912, Proc. Biol. Soc. Wash., Dec. 24, p. 186.

Type Locality—Cascade Mts., near the Columbia River

French, *Chèvre des Montagnes Rochées.*
Chinook, *Yalakan*, (ewe); *Schulopps*, (ram) (W. N. Beach); *Snow Mowitch* or *White Deer* (Allan Brooks).

The Family *Bovidæ* comprises large animals (Cattle) of the style of the common Ox. They have hollow horns on persistent bony cores, which grow larger each year, and are never shed: 4 hoofs on each foot, the hinder 2 smaller and higher than the fore 2; feed on herbage; have no upper incisors; a complex stomach, with 4 distinct compartments; and they chew the cud.

The Mountain Goat combines, in some degree, the outward appearance of Antelope, Goat, and Sheep. The present species is the only living member of the genus.

Its nearest relatives are the Forest-goats or Goat-antelopes of Asia —namely the Serow of Japan, and the Goral of the Himalayas; also the Chamois of the European Mts. All of these, including our Goat, are placed in the Subfamily *Rupicaprinæ*.

The Genus *Oreamnos* (Rafinesque 1817) may be thus characterized: Medium-sized, with short, erect horns; a beard on chin; nose hairy; coat, thick, long and white, much obscured by the abundant white wool or underfur; tail, very short; teats, 4.

Teeth: Inc. $\frac{0-0}{4-4}$; can. $\frac{0-0}{0-0}$; prem. $\frac{3-3}{3-3}$; mol. $\frac{3-3}{3-3} = 32$

As Seen Afar. The first time I met the White Goat, was in Glacier Park; and the impression it gave me, was of a fleck of snow lodged in a cave or on a shelf of the far, sheer precipice. Very soon I saw more flecks, and noted that these flecks of snow were all nearly of one size and shape, and were faintly tinged with yellow; then it dawned on me that these were Mountain Goats. It was hard to believe that anything on four legs could get to such places, much less elect to stay there.

As I came nearer, the Goats suggested common fleecy Sheep, new-washed for the shearing. And when close enough to make them go off at their slow, ambling pace, I thought at once of a White Bear, and remembered that Captain Cook probably saw the skin, and passed it for that of a little Bear.

Size of male. Length, 60 to 70 in. (1521 to 1775 mm.); tail, 6 to 8 in. (152 to 203 mm.); hind foot, 13 to 14½ in. (330 to 368 mm.). The large ♂ collected by Jas. L. Clark on the headwaters of Tanzilla River, B. C., Sept. 9, 1925, gave total length 64 in. (1623 mm.); hind foot, 13 in. (330 mm.); height at shoulder, 39 in. (989 mm.).

A very large ♂ is recorded by Baillie-Grohman as having a length from tip of nose to root of tail of 70½ in. (1787 mm.).[1]

The ♀ are about 10 per cent. to 20 per cent. less.

Weight. The average weight of the Goat does not exceed 100 lbs. says John Fannin.[2] But it is a creature of great individual variation. Some look no larger than a Common Sheep, and others have been mistaken for an Indian pony. A large one killed by Sir Edmund G. Loder, weighed 246 lbs. as it fell.[3] Another taken by John M. Phillips in British Columbia, weighed 276 lbs.[4]; 200 lbs. is near the average weight of a billy. In *Recreation Magazine* for June, 1898 (p. 437), is an account by O. D. Hoor, of a male Goat of extraordinary strength and valour, whose dressed weight was 225 lbs., which means a live weight of about 300 lbs.

According to Col. David T. Abercrombie, the very large one killed in southeast Alaska by S. E. Howard in 1913, weighed 502 lbs. I have seen the specimen; but can say only that it is an enormous animal.

The kid born in N. Y. Zoological Park, May 20, 1908, weighed 7¼ lbs. two days after birth, and stood 13½ in. high at the shoulder.[5]

Colour. Normally, the Goat is everywhere white, sometimes stained

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[1]Hunting, p. 199.
[2]Forest & Stream, Mar. 3, 1887, p. 107.
[3]Sport & Life, p. 115.
[4]Campfires, p. 90.
[5]N. Y. Zool. Soc. Bull., July, 1908, p. 429.

yellowish about the buttocks. The horns, rims of nostrils, lips, and hoofs black; the eye, yellow in adult, dark brown in young.

The ♀ is the same in colour as the ♂.

Among the Goat skins at the American Museum, fully one third have a scattering of dark brown hairs on the rump and tail; this dark hair is coarser than the rest. One specimen, a male kid from the Cascade Mts. of Washington, has a dorsal mane of brown hair, which is fully an inch wide; not well marked on the neck; but strengthening till, on the tail, it is brown and bristly, and ends in a tuft of long, dark hairs. These brown hairs, no doubt, are relics of the ancestral coat which the climbers wore when they lived on the lower rocks, or even in the woods, as do their kinsmen the Serow and Goral in the Old World of to-day.

Races

Four forms of Mountain Goat have been listed:

americanus Blainville, the typical form. It has a broad skull, and horns very little spread. T. l., Cascade Range, near Columbia River.

kennedyi Elliott, like the above, but with widespread, much ringed horns, and hollow forehead. T. l., Mts. at mouth of Copper River, Alaska.

columbiæ Hollister, a very large form, with a long, narrow skull, T. l., Shesley Mts., northern B. C.

missoulæ Allen, the smallest of all, with a short, narrow skull, T. l., Missoula, Mont.

Horns and Record Heads

The horns of the White Goat are wonderfully effective daggers for hand-to-hand combat, but rather insignificant as trophies. Nevertheless, it is the custom to go hard after them; and if won, parade them as scalps that show how great a warrior fell to one's prowess.

An average billy's horns are about 9 in. long. The nanny's are about as long, but more slender; which implies that she needs them as much as he does, but for a slightly different purpose.

Although Goats are not quarrelsome among themselves, they show a tendency to prod each other when closely confined. The horns are so sharp and effective as weapons, that it was found well in the Bronx to saw off an inch of the tips.

Rowland Ward's "Book of Records" (1922 edition), gives the following notable heads of billies.

The Wilson Potter head of British Columbia: Length, $12\frac{1}{2}$ in.; girth, $5\frac{1}{4}$ in.; tip to tip, $11\frac{1}{2}$ in. (Owner's measurements.)

The F. S. Groves head from Cassiar: Length, $11\frac{3}{8}$ in.; girth, 6 in.; tip to tip ? . (Ward's measurements.)

The Clive Phillipps-Wolley head from British Columbia: Length, 11 in.

Besides these, Ward lists 18 heads that have horns of 10 in. or more (12 of these are his own measurements), and 7 that are between 9 and 10 in.; nothing under $9\frac{5}{8}$ in. is listed.

A total of these points allowing the average where data are missing, gives them as follows:

1st Wilson Potter head with $29\frac{1}{4}$ pts.
2d F. S. Groves head with $24\frac{3}{4}$ pts.
3d Phillipps-Wolley head with $23\frac{1}{2}$ pts.

The record nanny head is owned by G. L. Harrison. It was taken in Montana and measures: Length, $11\frac{1}{2}$ in.; girth, $4\frac{3}{4}$ in.; tip to tip, $6\frac{1}{4}$ in. (Owner's measurements.)

The Horn Glands

Goats are noted for the number and activity of their musk-glands. Our White Goat is not, strictly speaking, a Goat at all, but an Antelope; and his glandular outfit is very limited. He has, however, one peculiar gift in this kind—unique, so far as is known: Behind each horn is a large, black, rubbery-looking boss that is an oil-producing gland. It is found in both sexes, but is largest in the male, and is particularly large and active during the rut. Prof. H. F. Osborn says that at that time, it "freely exudes an oil which softens the back of the horn, often causing a crease, as if the result of wear."[6]

Let us remember that musk-glands serve usually as means of communication. Being most active in the rut, they become helpful in getting the sexes together. At that time, the billies slash the brush with their horns as an impressive demonstration of power. The result is that that particular brush is anointed with the wireless message of the gland; and, from excessive use, the horn itself may be abraded into a crease.

His Snowy Robe

When Mother Nature decided to create an animal that could and would be happy in the uninhabited steeples that crown the great cathedral

[6]N. Y. Zool. Soc., 10th Ann. Rep., 1906, p. 226.

of the Rockies, she selected as raw material some hoofed thing of the lower levels, blessed him with a dauntless heart, nerves of iron, limbs of steel, and a coat of warmest wool, plentifully reinforced in an abundance of long, coarse guard hairs. Then she bleached her new plaything till he was pure white, and bade him go forth to glory in the promised land, where none were disposed to envy him or question his exclusive right.

It is proof of dry, unbroken cold in his native realm that the robe, so completely resistant to wind and frost, is a poor protection against rain. In the N. Y. Zoological Park, the Goat herd has been managed with great success by Keeper Bernard McEnroe. He early learned that the creatures cannot stand rain. He shuts up the herd under cover as soon as a rainstorm begins. If they were exposed to a drenching storm for 24 hours, their coats would water-log, and the chances are that pneumonia would carry off the lot.[7]

In their native wilds, it will be seen later, the Goats have caves of refuge for bad weather.

The fleecy underwear, that has won for him the name of "the only American Woolbearer," is 3 to 4 inches long, snowy white, and fine as merino.

G. B. Grinnell says: "Specimens which I furnished some years ago to Dr. Thomas Taylor, microscopist of the Agricultural Department at Washington, were called by some wool experts fine Cashmere wool; by others, Australian fine; and by still others, fine wool from various foreign ports. Doctor Taylor pronounced the wool finer than Cashmere wool."[8]

Long ago, the natives of the Goat country learned to spin this wool, and weave it into blankets. They gathered the wool either from the bushes or from the dead Goat; and spun it on the bare thigh, with the flat left hand, while the right hand held a spindle that gathered up the thread. Then with a warp of twisted cedar bark, strung on the simplest kind of a loom, and balls of this wool dyed yellow, brown, and black with native dyes, they wove the famous Chilkat blankets—each one a symbolic record of some totemic animal—a futurist, cubist, impressionistic design, so artistic and full of worth that Chilkat blankets vie with those of the Navaho, as the most beautiful the world has seen.

His Other Contributions

Horns. There was a time when the horns were carved into beautiful spoons. But here also the Demon of Commerce has breathed his poisonous

[7]N. Y. Zool. Soc. Bull., July, 1908, p. 429.

[8]Climbing for White Goats, Out-of-Door Library, 1897, p. 114.

breath on art. So that now the carved and inlaid spoons of Chilkat are being rapidly displaced by the cheap and melancholy product of the tinware factories.

Meat. How gladly would I spread the idea that the flesh of the Mountain Goat is rank poison. I would disseminate the same thought about the Bighorn and Antelope if I could. The fact is that, as soon as a large animal has proven good for human food, it attracts the attention of the aforesaid Demon, and its doom as a wild thing is sealed.

Most observers agree that the flesh of the Goat is tough, hard, and dry; also characterless, except in the case of the old ones, in which it has too much character; and is so strongly flavoured with musk that the latter end of an onion-fed Pole-cat would be chicken-breast in comparison. This aromatic exuberance reaches its climax in old billies during the season of the rut.

Some, however, maintain that the flesh of the nannies and kids is sweet and wholesome, provided that the creature found sudden death in a lawful manner during the lawful season; that is, by rifle, in the autumn. Most meat, indeed, is rendered poisonous if the animal dies fighting and furious, after a long pursuit, and a battle with Dogs or hunters.

History

The earliest recorded hint of this creature's existence is found in Captain James Cook's account of his Voyage around the World. In 1778, he visited British Columbia and Alaska; and in his log, makes several observations on the spun woollen garments of the natives. On May 20, 1778, when in Prince William Sound, he wrote (p. 393): "Besides these animals, there is here the White Bear of whose skins the natives brought several pieces and some complete skins of cubs." The Polar Bear is not found within a thousand miles travel of this place; and Kermode's Bear is equally remote; whereas the White Goat is common in the mountains about the Sound. Therefore it is probable that Cook was unwittingly writing of the Mountain Goat.

The following paragraph from Pennant[9] certainly refers to none other species, although he has confused the Bighorn and the Goat in parts of the account:

"I dare not pronounce that they [the Sheep] extend to the continent of America; yet I have received from Dr. Pallas a fringe of very fine twisted wool, which had ornamented a dress from the isle of Kadjak; and I have

[9]Arctic Zoology, 1784, I, p. 12.

myself another piece from the habit of the Americans in latitude 50°. The first was of a snowy whiteness, and of unparalleled fineness; the other as fine, but of a pale brown colour; the first appeared to be the wool which grows intermixed with the hairs of the Argali; the last, that which is found beneath those of the Musk Ox. Each of these animals may exist on that side of the continent, notwithstanding they might have not fallen within the reach of the navigators in their short stay off the coast."

In July, 1789, when at the mouth of the Mackenzie River, among the Hare Indians, Alexander Mackenzie wrote: "Reindeer, Bears, Wolverines, Martens, Foxes, Hares, and White Buffaloes are the only quadrupeds in their country; and that the latter were only to be found in the mountains to the Westward."[10] Reference to the map shows that these White Buffaloes might be either White Goats, or, as Richardson supposes, White Sheep. A consideration of their appearance makes it seem likely that White Goats were meant; especially as they have been called White Buffalo by several observers.

On the other hand, the White Sheep range very near to the Mackenzie River mouth, and the White Goats not within 500 miles.

In 1795, according to Richardson[11]: "Vancouver brought home a mutilated skin which he obtained on the northwest coast of America"; although Vancouver does not mention the fact in his own account of the voyage.

In 1805, Von Langsdorff was at Kodiak Island, and there saw the wool of the White Goat. He writes: "The Overseer Bander shewed me the wool of a wild American Sheep, which was whitish, fine, and very long, and is much used by the natives of the north-west coast of America for clothing and carpets. I never could obtain a sight of the animal that produced this wool; it must, however, be very different from the Argali, or Wild Sheep, *Ovis ammon*, for this has a sort of hairy coat, more like the Rein-deer, and nothing like wool. I do not know that any seaman or naturalist has described or mentions having seen the American wool-bearing animal in question."[12]

In the early part of their famous journey, Lewis and Clark refer to the Pronghorn Antelope as the "Goat." Later, they transfer the name "Rocky Mountain Goat" to the "Bighorn." On Oct. 30, 1805, when on the Columbia above Crusatte's River, they wrote: "We here saw the skin of a Mountain Sheep, which they say lives among the rocks on the mountains; the skin was covered with white hair, the wool long, thick and coarse, with long,

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[10]Voyages from Montreal, 1801, p. 76.

[11]F. B. A., I, p. 268.

[12]Voyages and Travels, G. H. von Langsdorff, 1814, p. 75.

coarse hair on the top of the neck and the back resembling somewhat the bristles of a Goat."[13]

On page 180, they amplify the description by stating that the natives manufacture blankets from the wool, and that according to the Indians, the creature has "erect, pointed horns."

But the entry which is usually considered the basis of the scientific description and name, was made April 10, 1806, when they were in the Cascade Mountains. It reads as follows:

"While we were at breakfast, one of the Indians offered us two Sheep-skins for sale—one, which was the skin of a full-grown Sheep, was as large as that of a common Deer; the second was smaller, and the skin of the head, with the horns remaining, was made into a cap, and highly prized as an ornament by the owner. He, however, sold the cap to us for a knife, and the rest of the skin for those of two Elk; but as they observed our anxiety to purchase the other skin, they would not accept the same price for it; and as we hoped to procure more in the neighbourhood, we did not offer a greater. The horns of the animal were black, smooth and erect; and they rise from the middle of the forehead a little above the eyes, in a cylindrical form, to the height of four inches, where they are pointed. The Clahclellahs informed us that the Sheep are very abundant on the heights and among the cliffs of the adjacent mountains; and that these two had been lately killed out of a herd of 36, at no great distance from the village."[14]

The first white man to see with his own eyes and describe on paper the White Goat was the intrepid Alexander Henry. On Feb. 9, 1811, he was at Kootenay Park on the Great Divide, near the National Boundary, and wrote: "Des Jarlaix, my hunter, I left behind to kill a White Goat, as it is here they are most numerous."[15] To this he adds,[16] concerning some the hunter went after, "We could perceive all three, still standing abreast upon the edge of the precipice, looking down upon us; but they were at a great height. . . . The White Goat is larger than the Gray Sheep, thickly covered with long, pure white wool, and has short, black, nearly erect horns. These animals seldom leave the mountain-tops. Winter and summer, they prefer the highest regions."

On the basis of the information supplied by Lewis and Clark, M. H. D. de Blainville, in 1816, described the creature, naming it *R[upicapra] americana;* but added nothing to its life history.

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[13]Lewis & Clark, Hosmer ed., 1917, II, p. 52.
[14]As above, II, p. 247.
[15]Journal, p. 691. See Buffalo References.
[16]As above, p. 695.

In 1822, C. Hamilton Smith described it as *Antilope lanigera*,[17] and gave an unmistakable portrait.

In 1825, Richard Harlan[18] published a letter from Major Stephen H. Long, who had recently returned from the Far West. In this, he gives the earliest known attempt at a history of the creature which Harlan first and definitely calls the "Rocky Mountain Goat." This seems strange, since Long himself had led the 1823 expedition into the Rockies; and in his report of the same, makes no mention of the White Goat.

The explanation doubtless is that his own expedition did not reach Goat country, and the account he gave to Harlan was hearsay from the Hudson's Bay Co. people at Fort Garry (now Winnipeg). Major Long's account is as follows:

"The Rocky Mountain Sheep inhabit the elevated region comprised in that portion of the mountain range from which its name is derived, situate between the 48th and 60th parallels of north latitude. They are found in great numbers near the head waters of the north fork of Columbia River, where their flesh constitutes the principal food of the natives. The country at the sources of Muddy River, (Marais river of Lewis and Clark,) Saskatchawin and Athabaska rivers are also inhabited by them; but they are said to be less numerous on the eastern slope of the Rocky Mountains than upon the western; they are seldom or never seen at a distance from the mountains, the climate and productions of which appear best adapted to their nature and mode of life. In summer, they resort to the peaks and ridges in quest of pasture, but retire to the valleys in winter. The size of the animal is nearly the same [as that] of the common Sheep; their fleece is white, interspersed with long hair, protruding beyond the wool, and standing erect on the surface of the body, which gives them a shaggy appearance; their horns are short, merely projecting beyond the wool of the head, and slightly arcuated backwards; these, together with their hoofs, are black, while the other parts of their bodies are uniformly white; their flesh has a musky flavour, and is, at best, unsavoury.

"They are of easy access to the hunter, who seldom pursues them unless compelled by hunger. Their fleece is esteemed of little value by the traders, and is used only as a covering to the feet during winter; their skin is of a remarkably thick and spongy texture. It has been asserted by good judges, that the silky fineness of the wool is not surpassed by that of the Cashmere Goat."

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[17]Trans. Linn. Soc., XIII, p. 38.

[18]Fauna Americana, pp. 257–8.

In 1829, Dr. John Richardson[19] gives a technical description of the Rocky Mountain Goat, and an account of it, dealing chiefly with its range and its wool. Added to this, is an etched figure by Thomas Landseer—quite good, except that it shows the creature with its head raised above its back, as in the Common Goat. This is an unusual, or even impossible, attitude for the present species.

Thus the facts trickled in, instead of coming with one sudden, complete picture, as in the case of the White Sheep, or the Antelope. But from this time on, there was a singular dearth of information about the White Goat; in fact, it became considered a great rarity, and even a myth. But in 1879, Dr. J. C. Merrill, an Army surgeon at Missoula, Mont., sent to Prof. S. F. Baird a brief but accurate article on the habits of the animal. This was published by the National Museum.[20]

In 1881, John Fannin, the British Columbia naturalist, published his valuable notes on the Habits of the White Goat. (See References.)

Even as late as 1884, Baillie-Grohman wrote:[21]

"For three consecutive years, I hunted on the breezy mountain ranges of Wyoming, Colorado, Idaho, and eastern Montana, living for months at altitudes over 10,000 feet; but I failed utterly to find this mysterious game elsewhere than in the conversation of romancing trappers and guides; a circumstance that created in my mind a decided tendency to look upon all "Goat" stories with a good deal of suspicious reserve. I heard a great number of such tales. Men told me that they had shot, knifed, lassoed, stalked, staked in pitfall, and otherwise 'gone for' the prized game; and that in their turn they had been gored, spitted, 'treed,' butted, trampled on, and generally roughly handled by redoubtable old rams; and though the Britisher in this instance declined to be 'filled up boots and all' with these hoary old myths of the ultra Western type, they yet generated in me an irrepressible desire to get at the bottom of these wonderful natural-history revelations. I determined that my next annual visit to the Far West was to be exclusively devoted to goat-hunting; and a letter I received in May, 1882, from a reliable friend and countryman residing in Western Montana, declaring that he had actually seen, not a live, but, what was next best, a dead Mountain Goat, made me pack my trunks and engage passage in hot haste."

Thus, in 1882, Baillie-Grohman satisfied himself that the White Goat of the Mountains was no myth. From that time on, goat-hunters greatly increased.

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[19]F. B. A., I. pp. 268–70.

[20]On the Habits of the Rocky Mt. Goat. Proc. U. S. Nat. Mus., 1879 (pub. 1880), pp. 283–84.

[21]Hunting, p. 194.

In 1890, John Fannin and Dr. George Bird Grinnell, both experienced mountaineers, published in *Forest & Stream*, a series of articles (see References) that made a very real creature of the White Goat. The further exploration of British Columbia, its homeland, has resulted in abundance of specimens and material. So that we are now in a position to map its range, and outline its way of life.

Range and Haunts

The map shows clearly that British Columbia is the proper home of the Mountain Goat; 95 per cent. of its race are British-born. Its long, slim and waning colonies in Alaska and Montana comprise the principal Goat population, outside of the "red map" region. Perhaps one quarter of its range is on the Rocky Mountains; the rest on the Cascades, Selkirks, Coast Range, and Bitterroots.

"All goat-hunters," says Hollister, "have noted the fact that Sheep and Goats are rarely found occupying the same range. Hunters commonly speak of a certain ridge or peak as a 'Goat mountain,' or as a 'Sheep mountain.'"[22] The Goat is happier up higher than the Sheep, and has different choice of food and weather. The details of their differences are not worked out. The absence of Goats from such mountains as Electric Peak in the Yellowstone Park is explained by the total lack of drinking places in summer.

An attempt is being made to introduce the White Goat on Vancouver Island, with what success does not yet appear.[23]

How big is the home range of a single individual? If we reckon up the actual acreage of the unbelieveably narrow ledges of its daily beat, we might put their total at less than 10 acres. But if we reckon the tall surfaces set on edge, and take the whole impossible bleak inferno over which its terrifying trails are coiled and flung, we may set the home range at half a township.

Or differently expressed, an up-ended pile of geological strata four or five miles across, affords ample changes of climate, food and scenery, to satisfy the wanderlust of the most restless of these bearded mountaineers.

Numbers, Yesterday and Now

The Goat is an exception to nearly every known rule; and he is an amazing and gratifying exception to the rule that man has wiped out nearly all the big game of America. For the land that the Goat inhabited 400

[22]Mamm. Mt. Robson, p. 43.

[23]Can. Field. Naturalist, Sept., 1925, p. 151.

years ago, it still inhabits; and, so far as we can learn, its numbers are the same.

If, then, we make a careful estimate of the present number of Goats, we shall probably know the ancient population.

When I was in the Glacier National Park in 1916, I used every means to get an estimate of the Goats that frequent the higher half of its 2,500 square miles. Most of the guides agreed that there were about 3,000. But Tom Dawson, with longer experience than the others, was sure that that estimate was too low; 4,000 he thought was nearer the truth. Let us call it 3,500; which gives a rate of 3 to the square mile.

John Muir reckoned that on the icy cone of Mt. Rainier in Washington, there were over 200 Goats in 1894.[24]

There are certainly 300 now; for they have been protected for years, and their enemies have been destroyed. As the Peak is about 20 square miles in area, this gives not less than 15 Goats to the square mile.

The Forestry Bureau census for 1922 gives the Goats in the National Forests of the 3 States concerned as follows:

Washington	1,550
Idaho	4,148
Montana	2,523
To which we add Glacier Park	3,500
Total	11,721

But this does not comprise all of the Goat range. So that, although the Biological Survey gives 6,000 in 1920[25], and the Forestry Bureau in 1922 gives only 8,634 in our National Forests, I feel safe in setting the White Goat population of the United States in 1925, at 15,000.

As the total area inhabited by Goats south of the "Big Medicine Line" is about 50,000 square miles, this would give about 1 Goat to 3 square miles. This, however, is the last fringe, the die-out.

The total area of the Goat range in America is 500,000 square miles. The Glacier Park data, give a rate of about 3 Goats to the square mile. This, as we have seen, is far exceeded on Mt. Rainier, and from the testimony of hunters is far exceeded in British Columbia; no doubt, however, it is offset in other regions by the absence of the sheer mountains that constitute Goat pastures. So that we shall be on the safe side if we assume an average of 2 to the square mile, and set down the total number of the

[24]Mountains of California, 1898, p. 323.

[25]Bull. 1049, 1922, p. 24.

White Goat nation to-day, at 1,000,000. In the light of other direct testimony, as well as the collateral evidence supplied by other species, this seems very near the facts, for the primitive. as well as the present numbers.

Food

We have seen that the Arctic Fox, in a land of dire famine, has expanded his bill of fare to include everything that lives or grows, that can, by any process of mauling, milling, and macerating within the powers of his digestive outfit, be made to contribute one tiny modicum of life-sustaining carbohydrates. Be it ever so small, and the percentage of waste ever so high, he thinks it worth a trial.

Such is the attitude of the White Goat in the Arctic region that is his very own—high in the land where clouds with peaks confuse. Grass, brushwood, moss, and lichens are his fare. In the summer, these are to be had for the easy taking, as he loafs and lazes on some rocky shelf between two bottomless gulfs. But in the winter, when there is deep snow to reckon with, it is not so easy. He can paw like a pony, for an icy meal, but he finds it more profitable to climb up higher to seek some even bleaker spot where the fierce grinding of the blizzard wind, has bared the skimpy grass between the rocks. Here he finds his fill.

The gale may be at 70 miles an hour, and the register of frost at 70 degrees; but these are matters of small concern, so long as he can find the cold-stored hay that keeps his life fires hot.

Two meals a day and many drinks, it seems are his established way. The meals are taken at sunrise and at sunset; but there are numerous exceptions to the rule. His food in captivity is detailed later.

Sanitation and Diseases

Salt-licks. It is commonly said that the Goat, in addition to his vegetable food, eats a great deal of clay. This, of course, refers to the "salt-lick." All ruminants of the high mountains seem under the necessity of repairing periodically to the salt-licks; and, having found a good one, the word is passed about among the Goats, so that their regular pilgrimages make deep-worn trails to the healing, tonic earths. They come for miles to a good "lick" and hang around like human wrecks at a health resort—soaking, rioting, wallowing to the limit, in this strange, cooling something that the fever of the body craves. For a day or two they stay; then retrace their steps to their high home.

Several of these licks I have seen and photographed. It was remarked

by the road-builders in Glacier Park that, after rocks had been dynamited, Goats, as well as Sheep, often came to lick them on account of their salty taste.

It is worthy of note that the species of the alkaline plains have no such need.

Dusting places. Apparently the Goat has need of a dust bath, much as chickens and grouse have. These dry wallows are dusty hollows scraped out by the Goat's fore feet. In these he rolls around, or lies sprawled out by the hour. No doubt, the dusting helps to dress his coat as well as to discourage insects. That is, his purposes are the same as those of a hen when she dusts her feathers. In Washington Zoo, and in New York Zoological Park, the Goats may often be seen indulging in a dry wash.

Grinnell writes me, however: "I don't believe that these so-called dusting places are anything more than the ordinary beds to which the animals resort day after day to lie and rest."[26]

Most creatures that dust themselves in summer, take also a snow bath in snow-times. The following shows that the Goat conforms to the rule.

Charles Greenwood writes:

"J. H. Holden . . . was prospecting, far up a tributary of Railroad Creek; and one day stopped to eat his lunch near some snow banks. His climb had been a long, hard one, and fatigue caused him to fall asleep. On awakening, there were Goats all around him. He counted 34. He lay there, quietly, and watched them. One would make a bed in the snow and lie there, rubbing itself a little while. Then it would get up, go a short distance, make another bed, and repeat the process, continually. The prospector thinks the reason for these antics was that wood-ticks were troubling the Goats, and the rubbing in the snow was to cool the irritation thus produced. It was in June too, and their winter coats were shedding."[27]

The Dung. The dung, as in all Deer, Sheep, Goats, and Antelopes, is in pellets; but differs from those of their near kin in being nearly triangular. From 50 to 150 are dropped at one time; and a dozen evacuations take place each day.

In the Zoo, at least, the Goat makes no pretence of setting aside a place for the dung-dump.

Diseases. The Goats have no diseases so far as known. They are never winter-killed, even in the hardest of weather. They seem, too, to have found an answer to each of the problems offered by the beasts of prey.

There are, however, two other enemies to be reckoned with. The first

[26]Personal letter, May 6, 1926.

[27]Recreation, Sept., 1897, p. 237.

is indicated in the Fannin-Grinnell article. Commenting on the Goat's indifference to strange noises, they add:

"While its failure to hear sounds, or at least to pay attention to them, may in part be due to the fact that, in the situations which it frequents, rocks are continually rolling down the mountain sides, and land-slides and avalanches occur so often that they are common noises of the mountains; yet we are inclined to believe that the White Goat is often partially deaf. On several occasions, we have noticed in skinning these animals, that their ears were full of wood-ticks. In a single specimen we have counted more than 20 of these insects, of all sizes, deep down in the cavity of the ear, many of them so gorged with blood as actually to stop up the auditory canal. Indians have informed us that sometimes persons so afflicted become deaf until the parasite is removed. Whatever the reason, it is certain that the White Goat displays little of the alertness and watchfulness that characterize most of our game animals, and that it may be approached by the hunter with less caution than any other of them."[28]

It was noted in blasting rock during the road-building in Glacier Park that the Goats paid little heed to the report that sent the Sheep off a-bounding.

Sociability and Voice

Some animals are sociable, some are gregarious. The White Goat is both, for it lives in small groups that help each other in present problems; and sometimes it gathers in large bands whose only bond of union seems to be their common interest in the food or shelter of the locality in which they are gathered.

Walter Gibb, of Glacier Park, with whom I followed the White Goat's trail in 1916, tells me that, in early summer, the usual group is 5 or 6; that is, one or two mothers with their kids. More than this are rarely seen together at that season. Later in the summer, however, they assemble in flocks of a dozen or more. In the fall and winter, it is common to see from 50 to 100, of both sexes. In Aug., 1916, at Ahern Pass, Gibb saw 32 together, but this was unusually early. One day, late the previous March, he counted 60-odd on Grinnell. Probably there are 50 or 60 there all the time. It is a favourite Goat range, having salt-licks as well as safe pinnacles and food.

This general rule seems to hold: When your glasses, ranging the far crag, pick up the white blot of a Goat that is surely alone, you may rest assured that you have found an old billy.

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[28]Habits, pp. 46–47.

Being gregarious, and also somewhat sociable, the Goat has many signal sounds. The common call is a deep, coarse grunt uttered by both sexes; and varied with age and the stress of the time. The kids have a little high-pitched bleat that seems used chiefly to call their mother's attention to some opportunity for service—just as our own little ones use their earliest squeak.

Vital Statistics

Gestation, Etc. The period of gestation is about 6 months. At Bronx Zoo, after a gestation of 178 days, on May 20, 1908, one of the Fort Steele nannies, then 3 years old, produced a vigorous kid. This was the cause of great rejoicing among naturalists; so far as known, it was the first ever born in captivity. Its size and history are given later.

Age. To what age does the White Goat live if successful in baulking all the foes that are native to his upland, or liable to confront him when he goes a-roaming on the Plains? The only direct evidence I have is as follows: In Banff (Alta.) Zoo, they have had a White Goat in captivity for 8 years. In the London Zoo, there was a fine male; he was captured June 12, 1899, when about 2 weeks old. He came to the Zoo June 6, 1900. When I saw him there on Oct. 29, 1906, he was in perfect health and vigour. He died, Jan. 9, 1909, when nearly 10 years old. Probably 10 or 12 years, then, is the usual lifetime of his kind.

Mating and Battling

The rut, whether in Idaho or Alaska, takes place in November, usually lasting the whole month. So far as is known, the Goats have no love-song corresponding to the bugling of the Elk.

What are the marriage laws of the White Goat? No one seems sure of them. This, however, I think, is a rule: In all highly polygamous animals, there is a marked difference in the sexes; the male being much bigger, more highly developed and with special ornaments or weapons, as in the Fur Seal, the Wapiti, the Caribou, the Bighorn, the pheasants, etc. In the monogamous kinds, the sexes are much alike, as in Fox, Cougar, Wolf, Raccoon, eagle, dove, swan, etc. Since the nanny and billy are practically alike, the inference is that the species is monogamous, although the tradition of their family is large and emphatic polygamy.

Furthermore, in support of the monogamous theory, we find frequent mention of one billy and one nanny on their honeymoon together.

Roosevelt tells of killing an old billy, that was with a nanny and a kid late in August, in the Big-Hole country of Montana.[29]

Fannin and Grinnell make a point of this: "Only on one occasion, however, have we seen an old male in company with several females. This was late in November."[30]

The guides in Glacier Park were not sure whether the Goats mate in pairs, or are polygamous. They inclined to believe the latter; and yet agreed that one never sees a billy with many nannies during the rut.

In the incident given later of the two billies and two nannies defending the kids from the eagles, we have evidence that points strongly toward monogamy. Under no other matrimonial arrangement could the males be with their families at the season indicated by the size of the kids. Similar testimony is offered by Dr. J. C. Merrill and B. Berendt on a later page.

It is clear, however, that the billies do fight for their mates in the fashion of their polygamous kin. The authorities above quoted say:

"Among themselves, the males have pitched battles which are often severe. We have never seen one of these, but instances are recorded where horns broken off in battle have been found encysted in the flesh of males that have been killed. The long, shaggy coat and the very thick hide of these animals protect the combatants to a great extent from severe injuries."[31]

The following incident, related by B. T. van Nostrand, of Brooklyn, N. Y., is much in point:

In 1901, he was shooting in the Goat country back of Fort Steele, B. C., when he had the luck to witness a finish fight between two large billies. He was on a lookout, watching for a Bighorn, and says:

"As I sat there motionless, two Goats came around a corner of rock only about 50 yards away from me. They were walking rather fast, and whenever the Goat in the rear caught up with the one before him, he gave it a blow with his head. It did not seem to be a vigorous butt, and at first I thought it was play; they were making a low, peculiar sound, such as I cannot describe in words.

"In a very short time, one of the Goats lay down behind a large rock, so that I could see only its head. The other Goat stood, and looked at the one lying down. Just then they saw me, and this seemed to stop the fight, for the standing Goat began to move away. I fired and killed him; but to my surprise the other Goat lay still. I could not hit him from where I was without spoiling his head, so I climbed around to get a better shot. Finally

[29]Wild. Hunt., p. 124

[30]Habits, p. 47.

[31]As above, p. 47.

I got up quite close, and had a good general view of him. Then he stood up, took one or two steps, and stood still. I then saw that he was bleeding around his neck, that one flank was badly torn, and that some of his intestines were hanging out until they almost touched the ground! He was so far gone he could scarcely stand, and to end his troubles quickly, I shot him.

"This was the only fight to the death that I ever saw among wild animals, and it was done quite differently from what I expected. There was no pawing of the ground, and no frenzied charging. One Goat quietly walked up to the other, and gave him a fierce thrust. The victorious Goat was not even scratched. I presume his first thrust was fatal to the victim."[32]

The Kid Mountaineer

In late April, or early May, the mother Goat, now less then 2 years old, after a gestation of 6 months, goes apart into some secluded corner of her rockland home, and produces her kid. Sometimes she has two, but three are unknown. On Sept. 24, 1916, at Grinnell, Glacier Park, I saw a nanny with two kids.

Fecundity is usually reckoned a racial advantage; that, therefore, two kids at a birth would be better than one. But other considerations come in. One that may be absolutely dominant is shown in this incident supplied me by N. Hollister. The Rocky Mountain Goat in the Washington Zoo, gave birth to two kids (♂'s) on May 20, 1921. The important ceremony of owning the kid is fully set forth in the Bighorn Life; it is just as essential among Goats. During the hour that the mother Goat was busied with the first kid, the blowflies attacked the second; and before she could attend to it, the maggots had entered both anus and umbilicus, so that it speedily died.

The kid born in New York Zoological Park on May 20, 1908, after a gestation of 6 months less 4 days, arrived at 3 A.M. At 3:10, it arose to its feet; by 3:30 it was *jumping* about the stall, and climbing on its mother's back, as she lay upon the straw. It nursed for the first time at 3:20. While nursing, it stood directly under its mother's body, and made a continuous whining noise, like a young puppy. Frequently it butted the udder as do young lambs; and then the mother patiently raised the hind leg to give her offspring a better opportunity.[33]

Amazingly strong and active are these young mountaineers from their very first days on the rocks; and yet it is not customary for them to follow

[32]Campfires, pp. 123–24.

[33]N. Y. Zool. Soc. Bull., July, 1908, p. 429.

the mother at once. A week or ten days they lie hidden, according to their strength and energy. They are visited by the mother several times a day to be nursed. In the second week, they are big enough and strong enough to follow where she leads.

At no time a coward, the Goat mother is capable of almost any heroism on behalf of her little one. A good illustration of her devotion is seen in observations that Prof. H. F. Osborn made in the Goat country of the East Kootenay River, British Columbia (Aug., 1905). His Dog had pursued a mother Goat with its kid. They made for their usual shelter, a rugged cliff; but the Dog was closing on the young one, when the mother turned and charged from 20 to 40 feet at the Dog. Both mother and kid would stamp their feet, and give a slight toss of the head and horns as they defied the Dog. After thus holding off the pursuer three or four times, the Goat escaped with her offspring over the brink of the precipice, where she was safe, and the Dog would have been killed, had he tried to follow.[34]

The Kid and His Bogies

The first fortnight is undoubtedly the most perilous part of their lives. Infant mortality runs high in Goatland; for the powers that make their success in life are now at their minimum. Many beasts of prey—Coyotes, Wildcats, Lynxes, Wolves, Wolverines, Cougars, Blackbears, and Grizzlies, as well as men and eagles—are all of them ready to feast on a young kid, if they can find him within reach. Yet, from nearly all of these, his own agility can save him, after the period of helpless hiding.

"Joseph Kipp has informed us that in the 'Colonel's Basin' in the St. Mary's Lake Region, Montana, he has seen tracks in the snow where young and old Goats have been chased by Coyotes. It would seem, however, that an old female Goat would have no difficulty in beating off a single Coyote which might attempt to seize her young. . . .

"It is possible that Lynxes and Wildcats occasionally kill young Goats, though probably this does not happen often."[35]

In the fall of 1905, Tom Dawson of Glacier Park, was with John Clarke on the back of Mt. Rockwell, when, across the valley, they saw a Grizzly-bear trying to catch a kid Goat; while the mother, from a safe place higher up, looked on with apparent unconcern, for she must have guessed that her young one was well able to take care of himself. The kid kept along the top of a slide, while the Bear scrambled along lower down, parallel, but

[34]N. Y. Zool. Soc. 10th Ann. Rep. for 1905, pub. 1906, pp. 228–31.

[35]Habits, p. 67.

climbing all the time. At last the kid reached the end of the slide. There it stopped and faced the Bear. The latter came on, and when within 10 or 15 feet, made a rush at the kid, which turned like a flash, and bounded up the nearly straight cliff toward its mother; whereupon the Bear gave up the attempt.

From a single Coyote or Wolf the mother could effectively defend the kid, as we may guess from her baffling of the Dog, as related, But there is another and more dreadful enemy.

Next after man, the eagle is the most dangerous foe of the White Goat. In spring and early summer, before the kids have acquired much strength or experience, these birds are persistent in their attacks. They kill numbers, seizing the young Goats on the cliffs which they frequent with their dams, and carry them off to convenient perches, where they devour them at their leisure. The Indians report that the destruction from this cause is considerable; and would be greater but for the wisdom and courage of the old ones. Two or three families will unite their forces and successfully defend their young.

More than one eyewitness has given us a thrilling account of these eagle attacks and their bafflement by the brave old Goats.

Thus L. L. Bales writes: "I once witnessed an attempt made by two large eagles to capture two kids from a group of two ewes and two billies. I was watching the group which was feeding on the moss that grew on a high slope of a rock thrown up by the movement of a glacier, when suddenly they bunched in a hurry with the kids under them. They sat on their haunches and kept their heads and horns up and out, and four larger ones forming a circle. They were a good half mile away, yet I shall always believe I heard the rush of those two eagles through the air in their attempt to capture a kid. I saw them make four unsuccessful assaults that day; but that they are successful at times I do not doubt. If they were not, they would not make so many attempts."[36]

In the spring of 1905, Charles L. Smith, the British Columbia guide, saw a female Goat successfully defend her kid from a golden eagle. The Goat stood close beside her young, and whenever the eagle swooped and sought to seize the kid, the mother would rear on her hind legs and make such vigorous horn-thrusts at the enemy that in a short time the eagle abandoned its attempt.[37]

But she cannot always save her little one, as is evidenced by an account published in *Forest & Stream*, Feb. 24, 1881: John Fannin, with a couple of

[36]Habits, p. 67.
[37]Campfires, p. 120.

Indian guides, was in British Columbia with the purpose of bringing back alive a young Mountain Goat. The older Indian was climbing after a very young one whose mother was leading it away. As the Indian came near, the mother reached a shelf to which the young one could not follow. Then in his own words:[38]

"All this time a large, white-headed eagle soared in majestic circles directly over the scene. After several unsuccessful attempts to reach its dam, the kid started back toward the point from which the Indian was advancing, but before proceeding very far, sprang down a narrow shelf and stood concealed beneath an overhanging bush.

"The Indian in the meantime working his way upward, stopped within a few feet of the place; but from his actions, I was satisfied he was ignorant of the kid's position. . . . He commanded, so far as I could see, the only way by which the kid could escape; for below was a perpendicular cliff of a thousand feet against the side of which no possible foothold for anything without wings could be seen. But in this I was mistaken, for a rock, loosened by the Indian's foot, rolling over the cliff started the little animal from its hiding place, and with a bound it sprang outward and down. The thought of its fate sent a shudder through me. A thousand feet, sheer down, to be ground to atoms on the rocks below. But no—down it went fifteen or twenty feet, alighting on a rocky cone which stood at a slight angle from the main cliff, on the top of which there was scarcely room for its feet huddled together. Had it started from that point and soared away over the tops of the trees which studded the valley, it would not have surprised me in the least, and I waited breathlessly for its next move.

"For a moment it rested like a speck of snow upon the dark gray granite cone; then with a downward spring of perhaps ten feet, it reached a narrow shelf which had before escaped my notice, and which ran along the face of the cliff to the wooded mountains on the right. But a sadder fate awaited the unfortunate animal than if it had fallen into the hands of the Indian. The terrible bird which in narrowing circles had kept about the scene, and whose piercing eye had taken in the vantage of the position—the kid separated from the protection of its dam—stopped suddenly in its course, then swooped downward swift as the lightning's flash, its great wings cleaving the air, and seizing the poor kid, just when life and liberty seemed so near, bore it clear of the cliff, fluttered a moment in mid air, then drifted downward along the mountain side, disappearing below the tops of the swaying firs."[39]

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[38]As given, pp. 64–65.

[39]Habits, p. 67.

The Developing Personality

The energetic personality of the kid is early developed. It may be illustrated by this incident given me by Abe Leeds, who was my Goat guide in the Bitterroot Mountains in 1902: In the spring of 1899, he was with his partner crossing a snow-slide on the Bear Creek, just below a great boulder that had partly split the slide, leaving a crack on the lower side. Goat tracks were plentiful; and as he passed this open crack, he looked in and saw a young Goat about seven feet down. The crack had apparently been drifted over, so the kid had walked on it and fallen in. He was about a month old, and quite well and lively. Leeds jumped down, but the kid attacked him vigorously—not with horns, but with fore feet. Leeds hoisted him out, and took him to camp, where they soon turned him loose. But he quickly found that this was the best place to feed; so he voluntarily stayed with his captors and became quite tame. He lost all fear of the men, and would come and stamp at their feet when teased.

The story of Fannin's kid, given at the end, offers a charming and detailed picture of a young Goat's mind. It also gives a delightful account of the game of tumble-down-a-sand-bank, which that kid played, and which undoubtedly is an amusement of all the wild kids at this hilarious stage of life.

In a wild state, their development is, of course, much faster than that of this captive. At a month, they are accomplished mountain-climbers. At 5 or 6 weeks, they eat some solid food. At about 2 months, their weaning begins; and now they are recognized members of the flock—with little influence, perhaps, but with votes already. For when an emergency causes a split in the band, the minority usually rejoin the rest, even though its number is chiefly made up of kids.

An interesting episode of this period, was told me by Louis Overturf, my guide, in the Bitterroots, 1902. He says that in the middle of October, 1898, he was in camp with a survey party on El Capitan. A flock of White Goats came in sight around the mountains. There were four nannies with a kid each, and one billy. Sometimes the old ones leaped to a place where the little ones could not follow, whereupon the kids set up a squealing like that of a Calling-hare. The old ones would wait then, and the kids skirmished around till they found an easier road to follow.

There seems to be a sort of mothers' meeting at this season, for nearly always two or more mothers with their kids are seen at this time; and sometimes the family reunion seems to be complete, for the billy is often seen in

these small bands. Merrill says, "During the summer the male, female, and kids keep together."[40]

B. Berendt, while hunting near Baker's Inlet, B. C., Sept. 24, says that he came on three Goats—"a family group consisting of a buck, a female and her kid."[41] Many other similar observations are at hand.

The History of the Bronx Kids

The life of the wild ones is admirably pictured for us by Charles A. Chapman, who set out with Jimmy Smith, to capture kids for the Bronx Zoo, in the spring of 1905.

On a mountain near Fort Steele, B. C., they found a number of kids, and chased them in vain all day. The tiny mountaineers, led by wise mothers, were too fleet for the men.

Next day, the hunters devised a new plan, and, quite unexpectedly, got some light on the powers and courage of the mother.

"By daylight," Chapman says, "we were breasting the heights once more, this time with Jimmy partly dressed in Goat skin. It was an idea of mine—that Goat skin disguise. By and by we marked an old nanny and a kid feeding out on a snow slide, whereupon we started to stalk as close to them as we dared. Tying a white handkerchief over Jimmy's head, to still further make him resemble a Goat, I started him on his hands and knees towards the mother and kid, hoping that the mater would mistake him for an overgrown billy of her acquaintance. I cannot say what she thought of the arrangement, but when he got within about twenty yards of the pair, the old lady put down her head and came for Jimmy with vengeance in her motherly eye.

"Goat's horns are sharp, and Jimmy knew it. It was no fault of his that he didn't strike Sweden in three jumps. . . . But the old Goat, when she found what it really was, quit that region at a pace that words won't describe very easily. The kid went with her, but not all our hopes. We followed after them, and about dark, we caught the kid at a place where there was an overhanging cornice of rock which the old one managed to negotiate, but which was too much for the little one."

Four others were quickly secured—in all, 3 billies and 2 nannies. Guided by experience, their captor fed them on St. Charles cream, thinned with warm water, and given in a feeding bottle.

"Truth to tell, I had not much trouble with the little fellows, and used

[40]Habits of Rocky Mt. Goat, Proc. U. S. Nat. Mus., 1880, p. 283.

[41]Field & Stream, Nov., 1920, p. 662.

PLATE LXXXI.—THE BIG RAMS OF MT. EVERTS

Photograph by E. T. Seton, Jan., 1914

PLATE LXXXII.—WINTER ON YELLOWSTONE CANYON

Photograph by E. T. Seton

to feed them about every three hours, day and night. If they got hungry, they would either jump on me or climb all over my body—for I slept in the little corral with them. I found if I left them, they got uneasy and tried all manner of ways to escape. . . . Poor little orphans, when I had them fed, they would all lie down close beside me and go to sleep, I suppose, or, at any rate let me get forty winks, till hungry again, when they would beat me with their fore feet. Their mothers must have a hard time with them, but not many others had as many as I was blessed with."

At first they were fed wholly on the cream and water, but soon it was found that they did better with an added ration of birch leaves and twigs. In the fall, he began to feed them a mixture of bran and oats, on which they throve. Also they greedily ate good clover hay, and were given all they cared to eat of it. They were in fine shape when sent to the Bronx in the late autumn.[42]

There, they were kept in excellent health on a diet of clean crushed oats (in the hull), sliced carrots and potatoes, an occasional apple, and all the clover hay they could eat.

Strange to say, their soft, woolly coats were found but a poor protection against soaking rain; so that the keeper had to shut them in shelter when a storm began.

Though not quarrelsome among themselves, they were so ready to prod each other with their dagger-like horns that it was found wise to saw off the sharp tips.

On May 20, 1908, one of these nannies, then 3 years old, produced a vigorous kid. Its size and history have already been given.

The Peace of the Crags

"It may be said," observe Fannin and Grinnell, "that, as a rule, these animals are quiet during the middle of the day. We believe that they feed and move about a good deal during the night, and they are usually to be seen feeding in the early morning for a couple of hours, and again just before night."[43]

It is his habit to lie on the southern slopes during the hours of sunshine, dozing, lazing, chewing the cud, or casting his golden-brown eyes in the far reaches of the land below; with mild curiosity noting the passing of other game.

Sometimes one old billy affects a particular perch and haunts it for

[42]Catching Kids, pp. 680–82.

[43]Habits, p. 28.

weeks. Short trips he makes at sun-up and at night, to feed or drink near the foot of his cliff. But his early impulse is to seek again his rocky lookout on which he is safe, or at least be near a stairway that leads to perfect protection from everything on four legs.

His occasional stolidity is shown in this remark by Fannin and Grinnell: "Often, indeed, a little group may be seen for 24 hours in nearly the same spot, scarcely changing their position a hundred yards."[44]

"They loved to lie on southern slopes, bathing themselves in the glorious sunshine, and blinking away the hours. Whenever a herd was sighted at rest, it was safe to count upon its remaining there for an hour or two, unless disturbed by a hunter."[45]

"But there was one old billy who fascinated us all," say Hornaday and Phillips. "When we looked out of our tents on our first morning in that camp, he was calmly lying upon a ledge at the foot of the cliff, immediately above us, near a bank of perpetual snow. For *two days* he remained there, at the same elevation, moving neither north nor south more than three hundred yards. When hungry, he came down to the foot of the cliff and fed on the tender plants that grew at timber-line, then climbed back to his favourite contour line, to lie and doze away the hours."[46]

"If any one," say Fannin and Grinnell, "will take the trouble to watch these animals day after day, he will observe among them a tendency to descend the slopes in the afternoon, and to reascend them in the morning. We say a tendency, for we do not intend to imply that the habit is universal. We are inclined to believe that this results from their seeking the highest, coldest peaks of the mountains during the hottest portion of the day. It is certain that heat causes them great suffering."[47]

Peculiar Habits

His choice of the frozen peaks does not imply that the Goat is wholly indifferent to gale and zero weather. Wind especially is obnoxious to most animals—not excluding man. And as we have already seen, the Goat is peculiarly sensitive to rain, wholly unequipped indeed to meet it.

It is not surprising therefore, that this creature of cathedral towers should often be seen in the niches thereof—that the climber of the peaks should seek for cozy, sheltering caves; should have, indeed, like the Hare, a dozen well-known forms that are adapted to a dozen different slants of

[44]Habits, p. 28.
[45]Campfires, p. 109.
[46]Scribner's, Aug., 1906, p. 143.
[47]Habits, p. 28.

wind and weather. Some of them are shelters from the fury of the storm; some give protection behind which he takes a sunbath. But all are well known to him, are frequented regularly, and are connected with his scheme and place of life, by perfectly known trails—trails that nothing but a Goat can follow.

The Poodle Trick.—One of the strangest and most unbovine habits of the Goat is his trick of sitting up on his hind legs with front paws dangling, like a Squirrel or a Bear. This is usually done when his curiosity is aroused.

Thus Roosevelt, telling of his Goat hunt, says, "The old billy saw me at once, but evidently could not quite make me out. Thereupon, gazing intently at me, he rose gravely on his haunches, sitting up almost in the attitude of a Dog when begging. I know of no other horned animal that ever takes this position."[48]

Baillie-Grohman adds that in consequence of this habit, "the hide and hair on the rump of old animals are quite worn and much thicker than elsewhere. On one occasion I approached such squatting Goats to within sixty yards."[49]

If one could see the white-bearded patriarch sitting up in the door of his cave, it would furnish some fine material for an Old-Man-of-the-Mountains story.

Swimming. Those of us who know the Bearded Sage of the Peaks, peacefully browsing along the cornices of his death-environed, cloud-capped steeples, hardly think of him as a creature that ever has a chance to swim. Yet, on the West Coast, where he ranges down to tidewater, he is known to swim rivers and arms of the sea, quite fearlessly, if it seem to him desirable to reach the other side without going around.

His Way of Life

Never shall I forget my first glimpse of the White Goat. It was at Iceberg Lake in Glacier Park, where we had camped overnight. When the sun arose, the sheer mountain wall across the water, was capped and girdled with clouds; its head was hidden and its feet were hidden. On the broad, straight breast between, like white sea-birds on their nests, were three or four Mountain Goats perched, or calmly moving about, disappearing or shaking their white beards as they lay at rest and chewed their placid cud.

How they got up there, I could not see. How they could get down, was past me. And the feeling which came over me, strong and insistent, was

[48]Wild. Hunt., p. 124.

[49]Hunting, pp. 198–99.

a throat-clutching of horror: Oh, mad things, you never can get down alive!

Yet they did—and do it every day. This is their way of life. No other creature on legs could do it, no Bear or Cougar. I doubt if a Monkey could, or even has the nerve to try. It seemed that nothing but a bird could frequent the appalling six-inch ledges strung brokenly on overhanging walls twixt dizzy death and blue eternity—and still live on, in the sweet complacency that is born of gratified instincts and unbroken success.

An old mountaineer it was that wrote of this white-bearded steeplejack: "He whiles away his leisure hours on the mansard roof of North America; and for recreation, he 'four-steps' along the edge of an abyss of the kind Doré has portrayed in illustrating Dante. After he has scaled the side of an almost sheer precipice, he peeps around the corner of the top of the world, and positively grins. . . .

"If there is a precipice bordered by a sound, flat top, the Goat invariably takes the edge and gaily trots along on juts of rock scarcely big enough for a hat rack. After you have climbed for hours, and are winded, shaken and exhausted, you will frequently locate him about a mile away on the other side of a ravine that you swear can't be crossed with anything short of wings. Then he stands there and *looks at you*, and if your glasses are strong you can positively see his whiskers wag."[50]

If, on some lowering morning when clouds and flying scud are drifting low over Manhattan, one could look from the Times Building, out and up to those higher peaks, the Equitable, the Metropolitan, and the Woolworth, and see white creatures—Goats, incredible Goats—crawling along the cornices, pulling themselves up on the turrets, or calmly chewing their cud as they lay looking down from the weather vanes, we should have much the same sensation as in watching the bearded mountaineer in his cloud-hung, perpendicular home.

What a perfect model he is for all mountaineers! He never lopes, and rarely trots; he is never in a hurry; and never moves till he is sure. No matter how great his danger, he plays the safe game, and makes slow haste to get out of sight. Not even when a month-old kid, can he be rattled by peril. Never once has hunter made him hurry his calm march, never in history has he been stampeded. In thunder, earthquake, or landslide, it is the same. You cannot shake his nerve by shooting. The shots may be falling all around him, but he never turns his bearded head or jumps; he seems neither to see nor hear you; but fixes all his attention on the trail he is picking out, and climbs fearlessly where no other four-foot on earth could follow.

[50]Russell Mott, Field & Stream, Aug., 1919, p. 392.

He does not hesitate to jump down 20 or 25 feet to a lower ledge; and no matter how icy it be, his hoofs are sure to grip. No one ever saw him miss his footing; with him there is no such thing as slipping or falling. He cannot leap upward very far, seldom attempting more than 3 or 4 feet. But I have heard the hunters describe his way of rearing on his hinder legs to reach up 5 or 6 feet, and hook his front hoofs over a higher narrow ridge; then, like a trapeze performer, haul himself up to some other impossible-looking shelf overhanging the abyss. Similarly, if there be head room, he can turn on a 6-inch ledge by rearing upright on his hinder legs; then facing about to drop on to all four feet, headed the other way.

Wm. W. Seymour, Mayor of Seattle, has sent me the following amazing observation on the White Goat's mountaineering. The exploit was witnessed and vouched for by four of his friends. They sign the following statement:

"Last August, we saw a Mountain Goat working his way up the almost sheer rock ledges of Little Big Chief. At a seemingly impossible place of the climb, I yelled involuntarily: 'Don't go there, you idiot—you can't climb that!'

"But he did just the same. In several places the Goat leaped his whole length (not height) upwards to the next ledge. Finally, he tried one jump he could not make. It was more than a long goat-length above him. His front feet just reached the rim of the ledge, but were not over enough to pull up.

"We expected the Goat to be dashed to pieces in a fall. Instead, he pushed against the side of the ledge with both front and hind feet, turned a complete somersault in the air, and landed securely on all fours on the ledge below, the one from which he had sprung." Signed—Joseph T. Hazard, Harriet M. Taylor, Florence McComb, Glen F. Bremerman.

Calm, self-confident, secure on his castle battlements, unassailable, and fearless is the white-bearded sage of the upper rocks. With nerves of steel, with limbs that fail not, and a heart for ever unafraid, the whole wide world of mountains contains not such another creature. He is, above all things on legs, the matchless climber, the king of the cloudy peaks.

Tree-climbing Goats

Many animals which climb trees readily, cannot follow a White Goat when he takes to his stairway. It is not surprising, therefore, to find that in menageries, the Goat delights in climbing up ladders and sloping trees,

though they must of necessity be either very sloping or much branched from the ground up.

The only case that I find in my notes was given me by my Bitterroot guide, Will Kerlee, as follows: In the February of 1900, he was tracking a Goat through the deep snow along Tincup Creek. The snow was very soft, and the Goat avoided it, as much as possible, by walking all logs. He had come to a lodge-pole pine that was nearly down, and he walked up this for 40 feet; then jumped down at a place where it was 8 or 10 feet from the ground. The pole was about 10 inches thick at the ground, and 6 where he jumped. There can be little doubt that he would have followed the pole even along its 2-inch thickness, had it served his purpose, or led to some ledge.

So far as recorded, the Goat has never walked a tight-rope; and yet the hunters who know him, have no doubt that he could do it with ease and certainty. Yes, even if it spanned a gulf 2,000 feet deep, and stretched between two peaks a mile apart.

His Chosen Homeland

He is not only the one hoofed animal in North America whose chosen haunt is cliffs above the timberline; he is the highest-placed mammal in our world. And nowhere, with possible exceptions in the Andes or Himalayas, is there another animal that, surrounded often by warm and flowery lands, deliberately elects to live in the realm of eternal snow, the upper side of the timberline. Birds may visit such places, in the brief, bright summer, but they lose interest in the peaks when winter comes. The high climbing Calling-hare and Chinchilla, with their parasite, the White Weasel, belong to lower levels. His unchanging coat of white is proof that the Goat is child of the lasting snow; and given only snow for drink and a scattering of the miserable herbage that snatched a hasty spell of life on the glacier's edge in the short bleak summer, the Goat cares not how high he may go, or how cold and blizzard-swept it may be. This is his safe and happy land, his own kingdom, with guardian dragons and angels that can neither be fought nor bought; and these they be,—the appalling crags, the snow-slide, and the blizzard wind.

Wise too is this white-robed steeplejack. He always knows where he is going, and usually has been there before. Every trail in his homeland is clear in his memory; he knows the range so well that mountaineers in a new region commonly get guidance from the Goat trails, for these are the ways dictated by complete knowledge.

"Once while bear-hunting at Lake Josephine with Charlie Smith," says the author of "Canadian Campfires," "we came to a particularly high, long, and smooth precipice. The rock wall was nearly half a mile long, and, I think at least six hundred feet high, with a hundred feet of very steep slide-rock at its foot. It curved around a basin, like the wall of a gigantic colosseum. A big and shaggy billy Goat elected to walk across the face of that appalling wall, about half-way from bottom to top, and as we slowly marched past far below, we watched him.

"He was so high up, that he felt no fear of us, and on the dizzy course that he elected to take, he looked like a mechanical toy pegging along. In that clear air, however, our glasses brought him down to us exceedingly well.

"As is always the case when upon rocks, the firmness with which each hoof was planted—to avoid slips, and to detect loose rocks—gave the animal a very stiff gait. His steps were long, as regular as the tick of a clock, and not for one second did the animal hesitate regarding his course.

His gait was steady as if he were walking along a smooth road, and the directness of his course was remarkable. Occasionally he paused to look down and scrutinize us; but after each inspection, he jogged on as indifferently as before. I am sure no Mountain Sheep, nor any other American animal, ever would attempt to go over that appalling course. It was a sight worth coming far to see.

"How could the Goat have known that a practicable route lay before him? There must have been a stratum of rock, harder than that above it, which had disintegrated more slowly than the rest of the wall, and left a projecting rim; but if so, our glasses failed to show it. The spectacle we saw was of a big Goat briskly promenading on nothing, straight across the face of a bare wall. We watched him with bated breath, as one watches a steeplejack who is repairing a finial; and for my part, I would not have shot him for a hundred dollars. To have killed him as he traced out that dizzy path would have been murder, no less; and think of the unforgetable horror of his fall through space upon that jagged slide-rock."[51]

There is a kind of trail on which the Goat specializes, that is, indeed, one of the dragons that guard the way to his country. This is on a sheer face, a 12-inch ledge that peters out, to resume after a gap of 8 or 10 feet, with dizzy death all about. There are few creatures would dare to make this leap; and yet the Goats take it without hesitation, and have never been known to fail.

When He Journeys

Commonly he sticks contentedly to the little hinterland of horrible crags above timberline that he calls home.

At other times, the self-confident old sage makes long journeys into far countries, over strange scenes, among most ungoatlike surroundings; such as open plains, broad, flat glaciers, mountain meadows, or fallen timber. Thus Grinnell tells me of a Goat that a friend of his killed far out on the prairie of Two-Medicine Lodge River. Very dangerous trips are these, but mostly made with a definite purpose; such as to seek a change of range, a cooler place, a new food, a salt-lick, or perchance a mate. These journeys are not undertaken often; but when they are, they are followed with a quickness and directness of aim that is most puzzling and impressive. His foes may find him as he travels, but there are few indeed that care to attack him at such times. He has two sharp daggers to fight with, he has strength, and he has courage that was never overmatched.

[51] Campfires, pp. 94–95.

Beware

And what manner of temper hath this calm child of the peaks? "Beware the wrath of a patient man," says an old adage. And our steady, sturdy, calm-tempered Goat is an outstanding illustration in point. Suppose that a Dog and a hunter close on him, as may happen at rare times; his lifelong *sang froid* does not desert him. He runs not one step from the Dog. The small White Buffalo halts, looking backward; he stands braced, out on some rock, apparently indifferent to his impending fate. But never rattler was quicker to strike when the right moment comes. The instant that the foolish Dog closes in, there is a vigorous lunge—a flash of that patriarchal head. The black daggers do their work,—a Dog stabbed to his death is sent flying through air into the fearsome gulf.

Just such a scene was witnessed by Enos A. Mills. He writes:

"Hunters and Dogs cornered an old billy near me in the head of a glacial cirque, in what is now the Glacier National Park. The Goat made his stand on slide rock at the bottom of a precipitous wall. He watched for an opportunity to escape, and made one or two himself. The Dogs surged round him. He leaped at one, and with a remarkably quick move of head, struck and impaled him on his sharp horns; with a twisting, upward toss of the head, he ripped and flung him to his death. In rapid succession he killed three Dogs. The fourth Dog was tossed entirely over a precipice. At this the other Dogs drew off.

"Finding himself free, the Goat did a little desperate rock work to gain a ledge, along which he safely climbed. He stepped accurately, and though the ledge was narrow and covered with small stones, there was no slipping and only a few stones fell. The Goat defied and defeated this pack of Dogs so coolly and easily that I could believe, as I had been told, that he is more than a match for a Blackbear."[52]

His Fighting Foes

After the arch-enemy man, who is an unnatural foe—because not natural to the Goat region, and never fighting fair nor with nature's weapons—the chief destroyers of the old Goats are Bears, Wolves, and Mountain Lions. As we have seen, the eagles are a menace to the kids.

"Largest," says John Fannin, "but least dangerous of the enemies of the White Goat, is the Blackbear, which, on the Pacific coast, at least, lies in wait for these animals among the rocks; and, if it fails in its first attempt

[52]Watched by Wild Animals, 1922, pp. 3–4.

at capture, often pursues it for a short distance. We witnessed an occurrence of this kind on one occasion on Mt. Yo, on the North Arm of Burrard Inlet in British Columbia. The Goat was seen trotting down the extremely rough slope, which lay between the summit and a bench where we stood, and not far behind it was a Bear in pursuit. Both animals were going slowly on account of the extreme roughness of the way. They came down to within 50 yards of where we stood, when the Goat turned off to the left. Our companion then shot at the Bear, which thereupon gave up the pursuit, and ran off. The Goat, after proceeding a short distance, stopped and looked back. It is doubtful whether a Bear could overtake a Goat among the rocks, though it could do so on level ground."[53]

"The larger Gray or Timber Wolf is a dangerous enemy to this species, and destroys many of them. We have found the hair and wool in the droppings of the Wolf, as has been done by others. Mr. Anderson speaks of the danger . . . and says: 'Wolves are great enemies to Goats and no doubt make great havoc when the kids are young. . . .'

"Mr. L. L. Bales writes us: 'That the large Gray Wolves catch them I know, as I have seen the wool and hair in the droppings left by the Wolves.'"[54]

John Muir told me that in northern British Columbia, the Goats frequent the grassy slopes above the timberline just below the needle-like pinnacles. Here they are safe from Wolves. But they are great wanderers, and he had seen them far out on the ice of the glaciers. Once, on the Muir Glacier, he saw two or three Goats backed up against a cliff, standing off some Gray-wolves. Night came down, and prevented him seeing the finish.

One can guess that the Goats would be slain, but that they would not die alone. The long black daggers would surely take toll of a considerable number of the assailants. Once, about three miles out on the Glacier, Muir found the remains of a Goat that had been chased out there and killed by Wolves.

In Idaho, my guides assured me that the adult Goats fear neither Dogs nor Wolves. Their chief enemy is the Mountain Lion or Cougar. Our party hunted hard for a month in the Bitterroots during the September of 1902. We saw two Goats and two Cougars, but got nothing. In one case, we found the tracks of a Lion following the track of a Goat and her kid. Lions were common here, to which fact is due the scarcity of Goats.

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[53]Habits, p. 67.

[54]As above.

There can be no doubt that the eagle is the worst foe of the kids, and the Cougar of the grown Goats.

Roosevelt supplies an exceptional light in the following: "One midwinter, my friend Willis found a Wolverine eating a Goat which it had killed in a snowdrift at the foot of a cliff. The savage little beast growled and showed fight when he came near the body."[55]

The Snow-slide

The last of the enemies—maybe the greatest enemy and the greatest friend of the Goat—is one of such character that it needs a chapter to itself. That friendly enemy is the snow-slide or avalanche.

"Avalanche" they used to call it in our books of a hundred years ago, because that was its name in Switzerland where chiefly one heard of it. But when the Rocky Mountains became known to our people and our writers, with a thousand times as many of these snow terrors as in Europe, they became a part of our daily thought, and thus perforce achieved an English name. So "avalanche" is now unknown to the hunters; "snow-slide" it is from end to end of the great snow-ridden chain.

These things we must remember to realize the terrors of the snow-slide: That it occurs in tens of thousands of places every year, chiefly in the spring; that commonly it takes a familiar trail, but often breaks off in a wholly unexpected place; and that it is terrible enough to dictate changes in the plans of railroads that wish to cross its country.

The dizzy peak, the blizzard wind, the muscle-racking climb, the slippery ice-cone, the treacherous rock-slide, are things that the brave and hardy mountain hunters reckon on, and face with resolution. But the snow-slide is a wholly different matter. Swift, sudden, unexpected, world-engulfing, overwhelming, absolutely inescapable as the Day of Judgment—its very name strikes terror; and at the season of the snow-slide, the bravest of the mountain men will tell you that they "hain't lost nothin' in them peaks."

The best description at hand of these overwhelming snow-quakes is by Col. Geo. O. Shields.[56] From his article I condense this account:

Had they been informed, the wise men who named the Seven Wonders of the World, would have made an eighth place to include the snow-slide of Goatland.

In some years the snowfall is light and the snow-slides are small. But

[55]Wild. Hunt., p. 129.

[56]Recreation, Nov., 1902, pp. 337–47.

sometimes there comes a winter when the snow piles up 10 or 20 feet on the hills. Then look out for world-shaking horror in the spring, when the slides break from their beds on the summit, to go roaring and speeding down to the canyon 5,000 feet below.

In the spring of 1902, Col. Shields and William H. Wright were exploring the mighty snow-ridden Selkirks; and pitched their tent in a forest of great cedars, about 100 yards from the north edge of a slide moraine, in order that they might have a good view of the great slide when it should come. They watched for it day and night. Finally, after having been in camp about two weeks, and when seated at supper one night, they heard an ominous rumble from far up in the mountain.

"There she comes!" said one of the boys. In an instant, their food was forgotten; they rushed out of the tent. By that time the roar, the grinding, the crashing were tremendous. The earth trembled under their feet, and the branches of the trees about, vibrated from the air currents set in motion by the great slide. The men could not see from their camp ground the high precipice over which the mass must plunge; and had not time to reach a point whence it could be seen. But, as they stood there, gazing in the direction of the roar, they saw great clouds of mist and snow rising through the tree-tops.

"There she goes over the precipice,' exclaimed Wright, as the whole earth trembled and boomed still more violently with the shock of the falling mass.

It had begun with a mere general heaving of the snowy mountainside, but the speed was ever increasing. Within a quarter of a mile, it was going at the rate of 10 miles an hour. When it leaped the cliff, it trebled its speed, and raced down the 60-degree incline with the rush and power of a hurricane.

A few seconds later, the vast wall of snow and ice swept in sight within 200 yards. It was like a tidal wave on the ocean. It came in an almost perpendicular wall, 20 or 30 feet high and 200 feet wide, with the loose snow curling, seething and foaming over its front. It gained force as it came. It gathered rocks—it gathered trees. The rocks were flung about and ground against the walls of the gulch. Uprooted trees on it were tossed hither and thither by the changing currents of snow, as a man would toss straws with a pitchfork. The winding of the gulch gave strange bearings to the white flood; the side confronted by a turn, would be checked. But quickly the pressure behind would increase until the front of the column of snow would break loose and surge on.

Sometimes one section or one line of the snow, having a greater pressure

behind it than another, would shear a channel straight through the main body that was moving more slowly, and would be forced to the front, leaving a cut with perpendicular walls that were polished smooth and clean, to a height of 10 or 20 feet. The world-roar of it was frightful. It was like the rumbling of an old-fashioned grist-mill, multiplied a thousand-fold; it was like a freight train passing overhead on an iron bridge, but intensified 10,000 times. Yet no simile can make one realize that thundering uproar, and the sense of its overwhelming might.

Forests of timber, thousands of rocks, tens of thousands of snowballs—some of them 20 feet in diameter—roaring, whirling, leaping high in the air, everything dim with spray and movement. Trees and banks, and small cliffs are ground to nothing. Had New York Post Office Building stood on that line, it would have been swished into the valley just as a house of cards would be swept away by a flip of your hand. If Brooklyn Bridge had stretched across its right of way, it would have gone down into the creek as easily as a cobweb before the broom.

This, then, is the irresistible, swift monster of the high peaks—the demon that, once aroused, cannot be dodged. The hunter in the track of a snow-slide is absolutely doomed, however swift or wise he may be. The flying, moving, rushing mountain side is after him, and will grind his bones and bury his every trace.

If there is anything on this earth that will take the conceit out of man in twenty seconds, and show his utter helplessness, it is to stand on the fairway of a snow-slide, and see it coming. It is the most appalling, the most heartrending, the most nerve-destroying sound and sensation that is known on earth.

The Goat and the Snow-slide

This is the remorseless demon of Goatland. Has the wise old Whitebeard of the high places some secret, that on him confers immunity, that turns the destroyer into a saving friend? So it would appear. For he has learned to live up high, beyond the snow-slides, especially in the springtime, when chiefly they are rife; he avoids the ravines and canyons which are their known runways. Finally, the Goat knows what it means, when the roaring begins in the high peaks; and he does not lose his nerve, but climbs some sheer cliff, with quickness and precision that usually spell salvation.

H. E. Jones, the well-known guide of Glacier Park, tells me that in the summer of 1916, he and two other men were high up on the Triple Divide, when they heard a roaring sound, and saw a huge rock break loose, to go

crashing down, taking more and more with it, till it was a regular landslide. After it had gone about 200 feet, a big billy sprang almost from under it. He made one jump, and landed on a rock 50 feet farther down, with all four feet together; and stood there unharmed, while the slide went by. He was evidently used to it.

Most of the guides testify that the Goat is so mountain-wise that he never gets caught. But there are occasional exceptions that have the emphasis of rarity.

W. Stephenson of Quesnel Fork, B. C., reports a Goat killed in a snow-slide in the mountains east of that town, in May, 1905,[57] and Col. G. O. Shields, when he studied the British Columbia snow-slides, in the spring of 1902, met with another case. Of this he has personally given me the following account: "Not far from my camp," he said, "was a small mountain-pasture in which was a White Goat that for several days remained in one spot. At last my curiosity was aroused. I got within easy rifle shot; and there, by the help of a powerful field-glass, learned that it had been seriously injured by some accident. Its face was badly cut and torn, and a section of its nose some six inches long, extending from about the eyes to the top of the nose, was an open sore. There was also a wound in one shoulder. I told Wm. H. Wright, the guide, that I thought it would be best to go up and see what the trouble was with this animal.

"We easily got within fifty yards of the creature, and found that the entire upper portion of its face had been torn off, and that the nostrils were exposed and bleeding. There can be little doubt that the carrying away of the Goat's face was done in some manner by a snow-slide, in which the Goat's head was held very firmly, while either a sharp-edged rock of large size, or a log, passed over it, grinding away skin and bone and laying bare the bottom of the nasal passage. There can be little question that as soon as warm weather and flies came, the Goat would die from the effects of its misfortune. Accordingly we crawled up, made several photographs of the Goat in various positions; then killed it, in order to put it out of its misery."[58]

Henry Bannon, writing of the Game Ranges of Klappan, British Columbia, says:

"From the Indians I gathered the latest stories about the game. Eight Goats were killed in the spring by a snow-slide on Ball Creek, a tributary of the Iskut River. There is no doubt that snow-slides in the north country cause a loss of much wild animal life."[59]

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[57]Campfires, p. 109.

[58]See also Campfires, p. 110.

[59]Forest & Stream, Sept., 1920, p. 485.

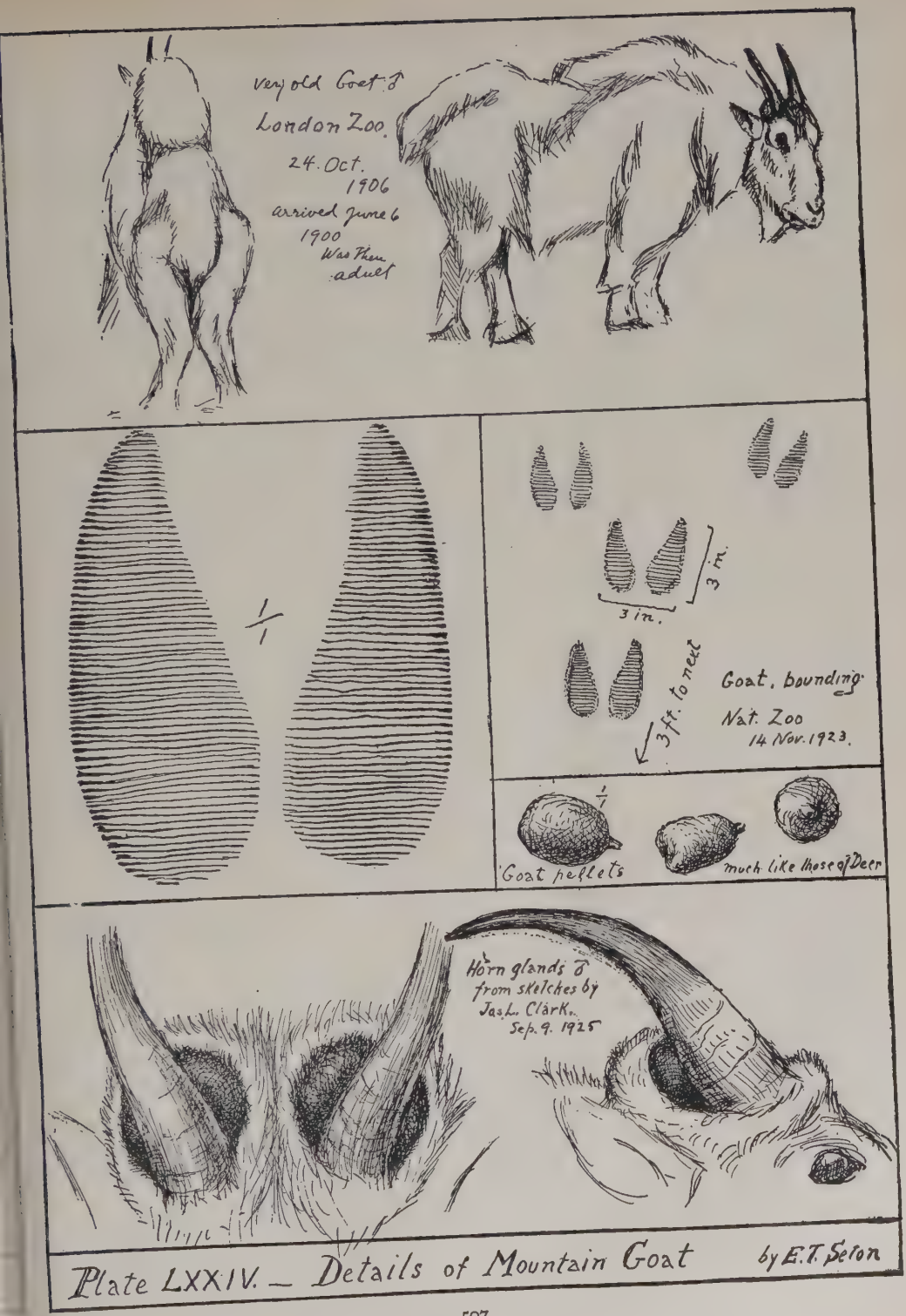

Plate LXXIV. — Details of Mountain Goat by E. T. Seton

A Calm White Hero

A hero is, of course, one who is not simply brave and wise, but who also is endowed with strength to back his courage and his wisdom. How brave and wise the Goat is, we have already seen; how strong, we may infer from the following incidents:

Walter Gibb, the guide of Glacier Park, tells me that on one occasion, with two other hunters, he ran a dozen Goats up a slide. At the top, they turned and rushed down again past the men, so near that one, a little fellow, Thomas Scott, seized a Goat by the hair. But it gave a bound, and escaped, throwing him some fifteen feet.

O. D. Hoor, a British Columbia mine-owner, relates that on Sept. 22, 1895, in the Trout Lake district, he had an adventure that shows the strength of a Goat. It had tried to cross the gulch. As soon as out on the level, two large Dogs and three men with axes attacked it. It could not reach the cliff and was handicapped by deep snow, but fought them off for half an hour before the 5 assailants killed it.[60]

Almost all hunters tell that when a Goat is cornered, he turns to fight, no matter how many or great his foes may be. At such a time, his manner is peculiar. First, he raises every hair on end, making himself look much larger and more terrible—exactly, indeed, as does his kinsman the Japanese Goat-antelope, that many of us have wonderingly watched in the Zoo. Next he snorts, puckers his lips, grits his teeth, sticks out his tongue, stamps and comes bouncing forward in little short, stiff, 4-legged bounds, like a bucking broncho. His head is low, and his two terrible little black bayonets are set for the charge—a charge which no Dog and no man could face without receiving a deadly wound.

In the section treating of "The Kid Mountaineer," it is told how a mother Goat fearlessly and successfully fought off the Dog to save her offspring.

B. T. Van Nostrand, of Brooklyn, describing the capture of the 5 kids for the New York Zoological Park, gives an idea of the power of a fighting mother Goat. As already noted, in the spring of 1905, Chapman and White, of Fort Steele, set out with 10 Dogs to round up a band of Goats in which were some kids. The Dogs rushed after the Goats, but the latter faced about and stood their ground; whereupon the Dogs closed in and tried to seize them. Instantly, before the assailants could sense the danger, the first two Dogs were stabbed to the vitals, and hurled over a precipice. It was done so quickly that no one realized what had happened until they saw

[60] Recreation, June, 1898, p. 437.

the Dogs mortally wounded and hurtling through air. The rest of the pack got the lesson, and held back. When the men came up, the Goats moved off. By rushing and manœuvring, the hunters were able to separate the kids from the band, and finally to catch 5.[61]

The climax, however, is contributed by Arthur B. Fenwick, a ranchman living near Fort Steele, B. C.

A full-grown billy Goat happened to stray out on the Joseph's Prairie where Cranbrook now stands.

"Old Chief Isadore, who was camped there, saw it. He and two other Indians thought that with Horses, Dogs and ropes they could catch the animal alive. I think fifteen Dogs left the camp for the Goat. A little later, a squaw saw that they were having a bad mix-up, and ran out to the Indians with a rifle. One of them shot the Goat. All but two of the Dogs were killed on the spot, or died very shortly. It was with the greatest difficulty that the Indians saved their Horses from getting punctured by those terrible little horns."[62]

Another amazing proof of valour unexcelled is contributed by Fenwick as follows: "A Goat will sometimes kill a full-grown Silvertip Bear! I once found a big Goat, dead, which evidently had been killed by a Silvertip, as there were lots of tracks all around, and the Goat's back was broken. I thought it queer that the Bear had not taken the Goat away and buried it, as usual, so I looked around. I found a large Silvertip Bear, dead, and all bloated up; and when I examined him, I found that the Goat had punched him twice, just back of the heart. He had been able to kill the Goat, and had then gone off and died."[63]

In an animal, subject to such vast variation, we must not expect a uniform high level of unshakable fortitude. John M. Phillips, of Pittsburgh, has had exceptional opportunities to watch the White Goats, and adds the following:

"The only time I ever saw a Goat really frightened, and show fear, was when Charlie Smith and I were hunting on the head of Wilson Creek, B. C. We had sighted a Grizzly-bear, and were following him up the side of a mountain and over the summit. It took us two hours to climb a distance that he covered in one. Near the summit, the Bear's trail led us through a little notch, and past the base of a pinnacle of bare rock, about 200 feet high, that ran up very much like a cathedral spire.

"Now it happened that as the Bear passed through the little notch,

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[61]Campfires, p. 122.
[62]As above, p. 121.
[63]As above, p. 122.

he frightened an old, long-bearded billy Goat, who immediately started up the pinnacle as hard as he could go, and climbed clear to its summit. And there the old fellow stood, or rather hung, in a most ridiculous attitude. His front feet were hooked over the eastern edge of the point, like a man looking over the peak of a steep house-roof, and holding on by his hands. His body and hind legs were well down on the other side of the pinnacle, and completely overhung a frightful precipice.

. . . . . .

"He moved his head in various directions, peering about, twisting his head, and squinting like a near-sighted man at a variety show. Four other Goats had taken to the high rocks on account of that same Bear."[64]

When He Fails

I do not know that the White Goat will be lowered—maybe rather he will be raised—in our esteem, if we learn that even this matchless mountaineer can and does, on rare occasions, make a costly mistake, a fatal error. We have heard how a kid slipped down a snow crack to be caught by the hunters; he, however, was just a kid. We have heard of a billy caught and mangled in a snow-slide—an enemy indeed, which nothing can foresee nor resist. Let us now hear of two sad accidents, that may beget a little sympathetic thrill.

While Goat-hunting in the Bitterroots in 1902, one of my guides, Louis Overturf, told me of this curious and tragic circumstance.

In the winter of 1885 or '86, he and his brother were out shooting on the Tincup Creek off Bitterroot Range. They went after a bunch of Goats. As Frank left Louis to go a different way with George W. Solider, they saw something odd-looking and white dangling from a tree that leaned from a high cliff. They soon made out that it was a Goat hanging there dead. Apparently, the Goat had walked out on the level trunk to browse—perhaps on the moss. On turning to come back, he had slipped; one leg went down between the trunk and a large branch with his body on the other side; so there he hung. The drop would have been a long way—perhaps 150 feet.

The most frightful accident of all, is that related by James I. Brewster, of Banff, Alta. While out with a hunting party in the early '90's, they were camped in the mountains northwest of Banff.

"They climbed to the top of a rugged mountain, and chased a band of Goats around its summit. The Goats went down over the edge of a rock

[64]Campfires, pp. 124–25.

wall which overhung so much that the animals could not be seen from above. Later on, when they descended to their camp in the valley, and looked up at the mountain wall, they saw their lost Goats, 5 in number, perched far aloft, on a narrow ledge. When night descended, the Goats were still there.

"The next morning, the hunters were surprised at finding that during the night the animals had not moved; nor did they move during that entire day. Then Mr. Brewster and his companions became convinced that the Goats had trapped themselves, and were unable either to go on or retreat.

"The band consisted of 2 adult Goats and 3 young ones. Naturally, it was the older animals that led the way into the danger; and it was the belief of the party that the adult Goats could not retreat the way they came because the young ones blocked the way, and were unable to go back. It was thought that the ledge was so narrow the Goats would not turn upon it, and the kids were unable to back out. We know that a young Goat can easily turn on a 12-inch ledge, provided the wall does not overhang; but an overhanging wall can make turning impossible.

"Mr. Brewster and his party became so interested in the fate of the trapped Goats that they remained in that camp long enough to witness the end of the tragedy. One by one, those poor Goats fell from their ledge, and were dashed to death on the slide-rock, hundreds of feet below. The hunters saw one of them fall; but the most of them fell at night. The last one fell on the tenth day after they took refuge on the fatal shelf."[65]

Oh, why did not the hunters use the merciful rifle when they realized the certainty of the trapped ones' doom! There is a time to grit one's teeth and calmly spill even innocent blood.

The Story of Fannin's Kid

As a character study, and a guide for those who would raise young Mountain-goats, I give this story from the experience and from the pen of John Fannin, the British Columbia naturalist.

It appeared first in *Forest & Stream*, Dec. 26, 1889, and was reprinted in the same periodical, Aug. 8, 1908 (pp. 211–12).

"About the 15th of May, 1881," he says, "an Indian came to my house, at Burrard Inlet, with the request that I would accompany him to his canoe and look at a *tenass mowitch* (small animal) which he wanted to sell me. I followed the old fellow down to the water, and stood by while he drew the thing out from the folds of an old blanket, and stood it on the beach. A little bullet-shaped head surmounted by a pair of tinv sharp-pointed ears, a mere

[65]Campfires, pp. 125–26.

handful of a body, propped up on four long and clumsy-looking legs, it was certainly the most ungainly animal I had ever seen. Its coat was of pure white wool, very short and slightly curly, and with very little appearance of hair except in the beard, which just showed itself beneath the lower jaw. There was no sign of horns, although slight protuberances could be felt beneath the skin where these would come. It was a male, and probably not over a week old; and the Indian had run it down on the side of a mountain after shooting its mother. I gave the Indian his price, $2, and picking the little waif up in my arms, carried it to the house.

"For two weeks, I fed it on cow's milk, weakened with water, feeding it about every hour, and allowing it only a very little milk at a time. Then, for a day or two, I added a little oatmeal to the milk; and before long, most anything of a vegetable nature was eagerly gobbled up by it. It appeared to be always hungry; but strange to say, it would allow no one to feed it but myself. It soon became a little troublesome, though, for, no matter where I went, the Goat followed at my heels like a Dog. At meal times, it would accompany me to the hotel and repose at my feet under the table. It would follow me into the woods on my short trips after grouse, and the report of my gun had little or no effect on it. If I climbed up on a stump and sat down for a smoke, the Goat would climb up too and sit down on its haunches by my side, and with its nose straight out in front, gazing solemnly into the gloom of the deep forest. So long as I kept quiet, it would remain motionless. The chirrup of a Squirrel or twitter of a bird failed to attract its attention in the slightest degree; but if I made the least motion to get down, it was up at once and ready for a spring.

"It had a great passion for high places which I imagine is born with the animal. When I first got it, I made a bed in one corner of the shed by filling a low box with clean, soft hay; the Goat standing by watching the operation. When it was finished, I picked him up and put him on the hay, pulling his legs from under him and making him lie down; in fact, giving him to understand that that was to be his bed. But as soon as I took my hands off him, he jumped out of the box. At the further end of the shed, which was about fifteen feet long, stood a pile of fir bark, six feet high, corded up in the usual way of cording fire wood. When he jumped out of the box he walked over to this pile and stood for a moment looking up at the top of it. Then he backed away from it till within a few feet of where I stood, and taking a run, climbed up that bark like a Cat; and lying down on the top looked at me as much as to say, 'This is the way we do in the mountains.' From then till the day he died, his bed was always on the top of that bark.

"He was an early riser, and long before my usual time of getting up,

he would rout me out by butting against the door. There were two domestic animals he could not bear the sight of—a Cow and a Dog. But while he would almost break his neck in the endeavour to get away from the former, the appearance of the latter aroused all the combativeness of his nature. One day a gentleman came into my shop accompanied by a setter Dog, when the Goat immediately assumed a belligerent attitude, walking around the room stiff-legged, his little hoofs coming down on the floor with a loud tap at every step. Finally he halted at a respectful distance from the Dog, and with his head lowered, bracing himself for a last effort, he seemed to be awaiting, or about to begin an attack. The Dog surveyed the little creature for a moment, and then, probably thinking it scarcely worth bothering with, lay down on the floor and went to sleep. As the Dog remained motionless, the Goat relaxed his rigid attitude and moved cautiously nearer, until, by stretching his neck, he brought his nose within an inch of that of the Dog. Just then a fly disturbed the Dog's slumbers, and in bringing up its paw to brush away the insect, it hit the Goat a sharp tap on the nose. Like the recoil of a steel spring, quick as a flash, the Goat sprang into the air, and in coming down and trying to alight as far away from the Dog as possible, he got tangled up in the legs of a wooden chair, which, in his hurry to get out of the house, he carried off with him. When he shook himself clear of the chair and looked round, and found that the house had not fallen, and that the Dog was perfectly quiet, he put on a look of utter disgust and skulked off into a corner of the yard where he lay down in a clump of weeds; and remained out of sight until the Dog was clear of the premises.

"As a general rule he was quiet, in fact, mopish; but when he did break out in a playful mood, some of his tricks were simply ludicrous. One day I was sitting with a friend in front of my house when the Goat, which had been cutting up pranks, evidently for our amusement, came and lay down at my feet. The cutting for the stage road, which ran past the house about fifty feet away, had left a steep bank of five or six feet high; that is, the road was so much lower than the plot on which we were sitting, Presently the Goat got up, and walking over to the edge of this bank, stood looking down this miniature precipice to the road. Suddenly he sprang into the air and pitched headforemost down the bank. I ran across, expecting to find the little brute with his neck broken, instead of which he was standing at the bottom shaking the sand out of his eyes and nostrils. When he got through, he climbed up the bank; and turning round, performed the same act again, turning a complete somersault on the way down. He did this about half a dozen times, occasionally throwing himself on his side and rolling down, covering himself from head to tail with dirt and sand.

"I allowed him the full liberty of the house; in fact, I could not control him, and it was this unlimited freedom that cost him his life. He was always with me in my work shop, and would always jump up on my bench, and stand sagely watching every movement I made. He had a great habit of picking up and chewing everything he came across; and one day he did this with one of my poisoned bird-skins. He had taken the skin outside the house, and the first I knew about it was when the little fellow came running through the door toward me, and fell before he quite reached me. I suspected what was the matter, and lifting him up poured some sweet oil down his throat, but he died in about half an hour."

He had lived in captivity for about two months.

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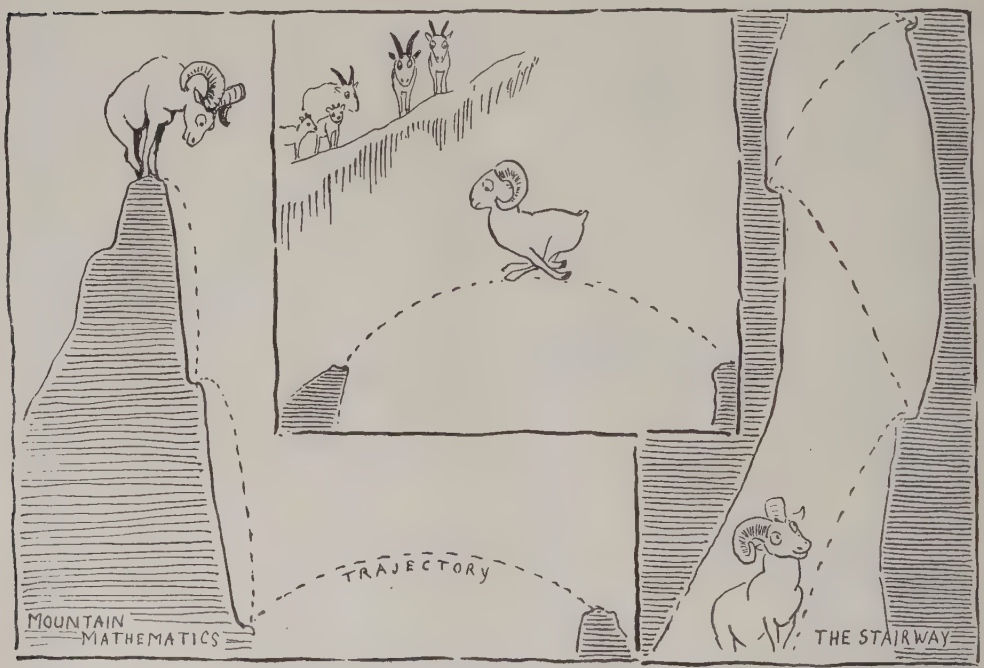

The Bighorn, Mountain Sheep, Brown Bighorn, Rocky Mountain Argali, American Ibex, Tayé, Wild Sheep of California, Mountain Ram, Deer-sheep, Sheep-deer, Thick-horned Sheep, Curl-horned Sheep

Ovis canadensis Shaw

(L. *Ovis*, a Sheep; *canadensis*, because it was first described from the Canadian Rockies)

Ovis canadensis Shaw, 1804, *Naturalists' Miscell.*, Vol. 15, Feb., pl. 610.

Type Locality—Mountains on Bow River, near Exshaw, Alta.

French Canadian, *Bélier Sauvage de Montagne, Grosse Corne, Cul-blanc.*
Mexican, *Cimarron.*
Hopi, *Pang̀-wuh* (Mearns).
Crow, *Is-pwir-té-té.*
Slave, *Sass-sei-yewneh* = Foolish Bear (Richardson).
Cree, *My-attick* = Ugly Reindeer (McGillivray).
Blackfeet, *Emo-ki-canow* (McGillivray) *E-mah-kí-kin-i* = big-head (Grinnell).
Mandan, *Ahsahta* (Lewis & Clark).
Ogallala Sioux, *Ta-hin-cha Sunka-la* (Dr. J. R. Walker).

The genus *Ovis* of Linnæus, to which this animal belongs, are ruminants of the Sheep type. They are large animals—most of them larger than the domestic Sheep—stoutly built, with medium or short legs; ears, small and pointed; tail, short, pointed, and without a tuft on the end; feet, with 4 hoofs each; snout, with small naked place between the nostrils; chin, without beard; glands between toes and under the eyes; mammæ two; horns in both sexes, those of the ram very large and massive, sweeping back, round, and up again in a noble curve, and bearing, besides many wrinkles, a rugged cross ridge for each year of his age. The horns of the ewe much smaller and nearly straight.

Teeth: Inc. $\frac{0-0}{3-3}$; can. $\frac{0-0}{1-1}$; prem. $\frac{3-3}{3-3}$; mol. $\frac{3-3}{3-3} = 32$

When the Bighorn is seen wild in its native surroundings, the first impression is of a Deer with ram's horns. In colour, it seems all over, of a dull grayish brown, with white nose and stern.

A closer view shows that it has a blackish tail whose colour is joined to the brown of the back, by a long dark stripe cutting the rump patch in two; and that it wears white stockings with dark front facings.

Size. A ♂ from Wiggins Fork, Wyo., Sept. 21, 1906, No. 27393, Am. Mus. Nat. Hist., measures:

Length, 6 ft. 5 in. (1,953 mm.); tail, 5 in. (127 mm.); hind foot 15½ in. (394 mm.).

For the benefit of sculptors and taxidermists, I give fuller measurements of a fine ram that John Muir got near the Modoc Lava-beds northeast of Mt. Shasta:

Length from nose to root of tail, 5 ft. 10½.; length of tail, 4½ in.; height at shoulders, 3 ft. 6 in.; girth of chest, 3 ft. 11 in.; length of ear, 4¾ in.; length of horn around the curve, 33 in.; girth of horn at base, 16 in.; tip to tip of horns, 29½ in.

The ewe is much smaller than the ram.

A large ♀ in the American Museum measured as follows: Length, 5 ft. (1524 mm.); tail, 5 in. (127 mm.); hind foot, 15½ in. (394 mm.).

A more representative ewe which I collected on Eleanor Creek, in the Wind River Mts. of Wyoming, Oct. 6, 1898, was as follows:

Length, 4 ft. 6 in. (1,369 mm.); tail, 4¾ in. (120 mm.); hind foot, 15½ in. (394 mm.); length of head, 11⅝ in. (295 mm.); height at shoulders, 34 in. (862 mm.); from breast to ground, 17½ in. (445 mm.); from hock to ground, 14 in. (355 mm.); girth of chest, 40½ in. (1,027 mm.); girth of belly, 46¼ in. (1,172 mm.); from point of snout to base of ear, 10¼ in. (260 mm.); length of eyeball, 1 in. (25 mm.); length of ear, 5 in. (127 mm.); width of head through the eyes, 6¼ in. (158 mm.).

Weight. Clarke Fisk sets the weight of 2-year rams at 110 lbs.; of 3-year-olds at 170 lbs. According to all available testimony, 300 lbs. is about the average weight of big, that is, 6-year-old rams. John M. Phillips's heaviest British Columbia mountain ram weighed 316 lbs.[1] Audubon gives the weight of his fine ram at 344 lbs., of which the horns were 44½ lbs.[2]

The ewe whose dimensions he gives on the same page, weighed 240 lbs.; which is surprising. But Audubon is Audubon, so we must accept it, even though at times Audubon be Bachman, which is equally good.

[1]Personal letter.

[2]Q. N. A., II, p. 165.

The full-grown ewe which I secured Oct. 6, 1898, weighed only 136 lbs., and a second taken the same day, a 2-year-old, was 103½ lbs.

Colour. In early autumn, the proper season of the sportsman's interest, the Bighorn's coat is short, smooth, and dark.

The late September Wyoming ram, whose size has been given, is, in general colour, of a soft brownish gray which is much darker and becomes of a dark caribou-gray on the nape, throat, chest, armpits, legs, and tail; also on the band that joins the tail and back. In this gray, there is an almost purplish tinge. The snout, space about each eye, ear-linings, rump-patch, horns, scrotum, belly, a band down the inner back side of each leg, and another down the back edge of each hind leg, is *yellowish white*. On all four feet, the white band runs onto the outer toe, leaving the inner one dark. Three well-marked colours it shows—brownish gray, purplish gray, and dull white.

A Cascade Mts., B. C., specimen, ♂, Dec. 7, 1889 (A. M., No. 14478), is quite similar in pattern, but in general of a warmer brown and deeper tone.

The horns are of a dark umber brown; the hoofs black, and the eyes in all adults of a beautiful pale amber or golden yellow. In the lambs, the eyes are brown.

Some specimens have the white of the snout expanded so it covers the whole face; and in some, the back stripe does not cross the stern patch to the tail.

Sheep are darkest in late summer and early autumn. The hairs are darkest at the tip, and lighter and grayer toward the base; the bases of those on the head being nearly white. By December, the coat begins to fade a little from exposure. It also becomes brittle as it ages, so that the combined result of the fading and wearing off of the dark points is continuously to lighten the animal's colour. The face gets much hard rubbing in feeding, so that the white roots of the hair are more or less exposed by the springtime. Many have the face pure white by February, when May comes, the process has gone so far that many Sheep look white at a distance; and have thus given rise to the report of Mountain Goats in Colorado. In June, the old hair is shed; and in their new, sleek, short, August coats, they are once more of a rich brown. This hue, however, is subject to much variation, some specimens being slaty, and some very dark umber.

At this time, the ram looks very slim, sleek, and deer-like; but the lengthening of the hair and thickening of the fur, combined with the general fleshing of his body as the cool weather approaches, give him quite a burly, thickset, and massive look by early winter.

In colour, the ewe is much like the ram, but paler and of less emphatic

pattern. In several examined, the tail stripe did not cross the white stern patch.

Her changes of coat are like his.

A discussion of the horns appears later.

Races

Ranging as it does from the arctic regions in Alaska almost to the tropical on the point of lower California, the Bighorn is unique among our Big Game. Since it inhabits so many faunal areas, it has, of course, split up into a great many geographical races, and maybe several species.

Extreme splitters have made 5 or 6 separate species. Extreme lumpers, especially those of the English School, make only one species, *Ovis canadensis;* of which all the rest, even the Kamchatkan species *nivicola*, are listed as mere geographical races. Amid such diversity of opinion, it may be well to keep the middle of the road, and treat the American Bighorns as two super-species: The heavy-horned, Rocky Mountain Bighorn with its 10 races, and the slender-horned, Alaskan Sheep with its 5 races. The latter is treated in a separate Life.

The following are the recognized races of the Rocky Mountain species:

canadensis Shaw, the typical form as described. T. l., near the site of Banff, Alta.

auduboni Merriam, a large animal with the largest teeth of all the group. Horns narrower and longer than in *canadensis*. T. l., Badlands of South Dakota.

californiana Douglas, like *canadensis*, but much darker in colour. T. l., near Mt. Adams, Wash.

mexicana Merriam, large; ears nearly double the size of those of *canadensis*. In colour, darker than *nelsoni*, lighter than *canadensis*. T. l., Lake Santa Maria, Chihuahua, Mexico.

nelsoni Merriam, a desert form; small and very pale, with rump-patch crossed by dark tail line. It looks remarkably like a pale edition of the Black Sheep (*stonei*) of the Liard country. T. l., Grapevine Mts., east edge of Inyo Co., Calif.

sierræ Grinnell, like *nelsoni*, but larger, with shorter ears and tail; coat grayer and heavier; horns at base, round instead of triangular. T. l., east slope of Mt. Baxter, Sierra Nevada, Calif.

gaillardi Mearns, a small race like *nelsoni*, but darker; without white nose; feet, small; horns 2 or 3 in. apart at the base instead of nearly touching, and strongly incurved. T. l., between Tinajas Altas and Mexican boundary line, Ariz.

cremnobates Elliot, much like *nelsoni*, but paler. T. l., Matomi, San Pedro Martir Mts., Lower Calif.

texiana Bailey, a pale form; between *canadensis* and *mexicana* in colour; with narrow muzzle bones and heavy dentition. T. l., Guadalupe Mts., El Paso Co., Texas.

sheldoni Merriam, a dwarf form from Colorado Desert, T. l., El Rosario, northern Sonora, Mexico.

History

When Coronado, on his famous journey, reached Cibola in 1540, he wrote (Aug. 3) to Mendoza, the Governor of Mexico, a long account of the place and its products. The following is an extract:

"They have many animals—Bears, Tigers, Lions, Porcupines, and some Sheep as big as a Horse, with very large horns and little tails. I have seen some of their horns, the size of which was something to marvel at."[3]

This is the first record in our histories of American Bighorn Sheep seen by Europeans.

Over 150 years later, that is, in 1697, Father Juan Maria de Salvatierra crossed the Gulf of California, from the mouth of the Yakui River to the California Peninsula—then supposed to be an island. He was soon joined by Father Francis Maria Piccolo. They established missions during the following five years of their sojourn there, at various points from about latitude 26° southward to La Paz. It was in this region that they became acquainted with the Tayé, or Mountain Sheep, as recorded by Father Piccolo, the historian of these missions.

After a year or so, Father Eusivius Kino discovered that this "California" was not an island; and on February 10, 1702, the fact, with a map and description, was published by Father Piccolo. In it was an account of the Tayé or Mountain Sheep. It is here quoted in full, for it is the first detailed appearance in print of the American Bighorns; and is, further, "the source of all subsequent accounts of Sheep in California, based on the records of the early Jesuit missionaries.

"Besides several sorts of Animals that we knew, which are here in plenty, and are good to eat, as Stags, Hares, Coneys, and the like; we found two sorts of Deer, that we knew nothing of: We call them Sheep, because they somewhat resemble ours in make. The first sort is as large as a Calf of one or two Years old: Its Head is much like that of a Stag; and its Horns, which are very large, like those of a Ram: Its Tail and Hair are speckled,

[3]Winship's Coronado, 14th Ann. Rep. Ethno., p. 560.

and shorter than a Stags: But its Hoof is large, round, and cleft as an Oxes. I have eaten of these Beasts; their Flesh is very tender and delicious. The other sort of Sheep, some of which are White and others Black, differ less from ours; they are larger, and have a great deal more Wool, which is very good, and easy to be Spun and Wrought.'"

Thus, the "California" where the Tayé was found in 1697, was the peninsula of Lower California. The California of to-day had not at that time become a field of missionary enterprise; was, indeed, entirely unknown.

It is interesting to note that the Mountain Sheep occupy those very same hills to this day.[4]

This account by Piccolo continued, for about 100 years, to be the only published information about the Bighorn; and it is amusing now to recognize its unacknowledged offspring in most of the published natural histories that treated American game animals during the next two centuries. Each succeeding recorder simply made his own dilute of this, the original account.

The best known of these conscienceless writers was Father Miguel Venegas, a Mexican Jesuit, who in 1758 published his "Noticias de la California" (of which an English edition in 2 vols. appeared in 1759, called "History of California"). In this Venegas repeats Father Piccolo's account, but adds a picture of the Bighorn which he calls "The Tayé or Californian Deer," Tayé being its name in the Monqui tongue. This engraving is produced herewith ($2\frac{3}{4}$ x $3\frac{1}{4}$, original size). It is doubtless the earliest representation of the species. (Plate LXXVI.)

Some eighty years later (1784), Thomas Pennant, in his "Arctic Zoology," included the Argali among his American animals, citing the above missionaries as his authorities.

In the fall of 1800, Duncan McGillivray, a clerk in the service of the North-West Fur Co., was on the headwaters of the Bow River (near where Banff now is) with David Thompson, the famous explorer. While hunting, he came on a small herd of Bighorn. He recognized them as a new species of animal; and being a man of understanding, he sent a specimen to the Royal Society of London, where it arrived in 1803, and was promptly named and described by nearly everyone in the world of zoology.

Dr. George Shaw, however, managed to get his name published first; so it stands to-day *Ovis canadensis* Shaw, Feb., 1804. This was followed by *Ovis cervina* of Desmarest, March, 1804; and then by *Ovis montana* of Schreber, April, 1804. These facts, established by Dr. Wilfred H. Osgood,[5]

[4]Allen, N. A. Sheep, p. 19.

[5]Proc. Biol. Soc. Wash., Feb. 2, 1914.

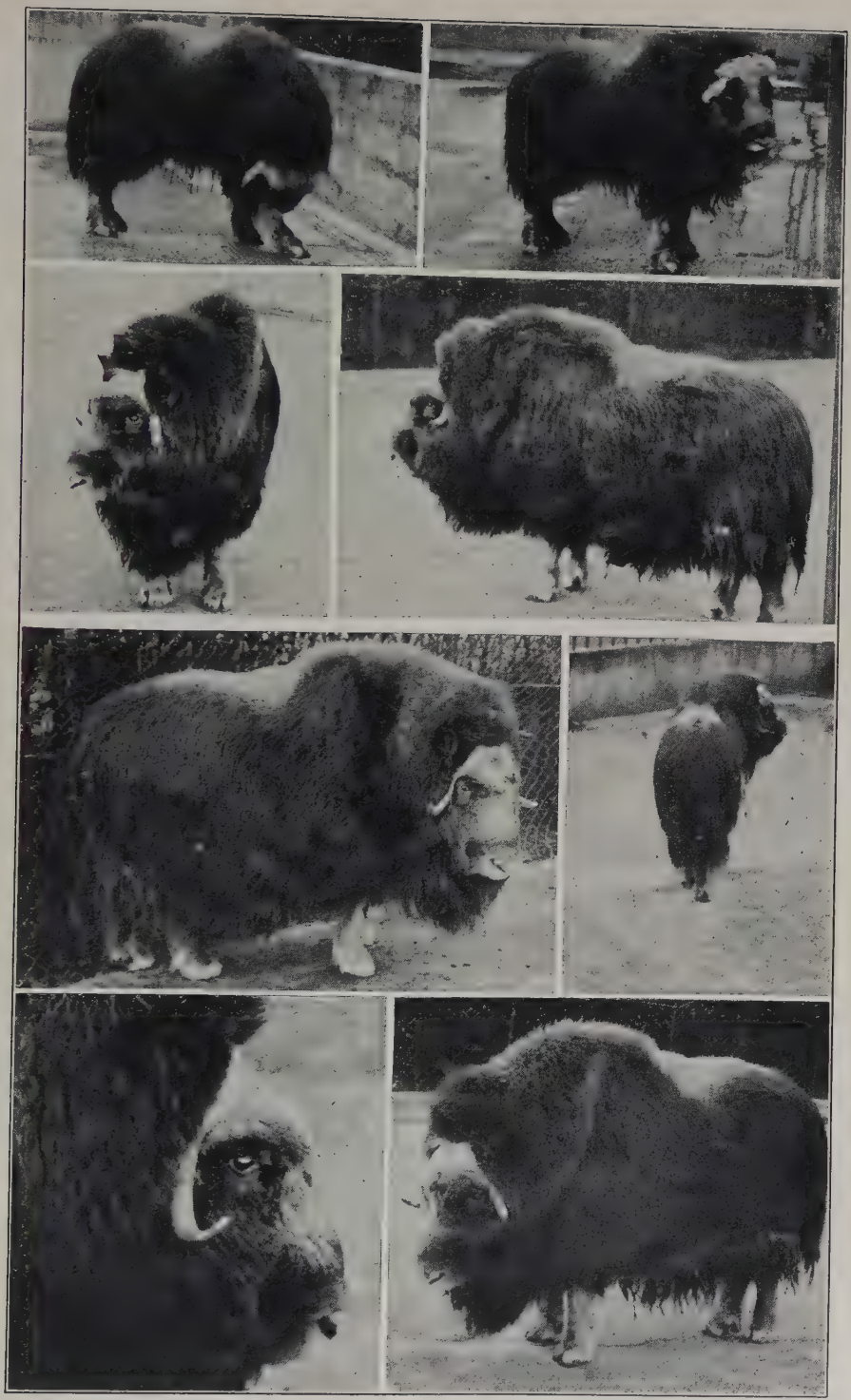

PLATE LXXXIV. MUSKOXEN IN LONDON ZOO

The two at the top show a young bull $2\frac{1}{2}$ years old. The rest are adult cows.
Photographs by E. T. Seton

PLATE LXXXVI.—PAIR OF MUSKOXEN IN WASHINGTON ZOO, SHOWING THEIR DEVELOPMENT FROM YEARLINGS TO 4-YEAR-OLDS

Photographs by E. T. Seton

have set at rest the question of the creature's scientific name and its godfather.

The story of McGillivray's hunt appeared first in the New York *Daily Advertiser*, Dec. 4, 1802. It was reproduced in several other periodicals, especially the New York *Medical Repository*, Vol. VI, 1803, pp. 238–40.[6]

After this, other travellers reached the Far West. Each of them added a little to our knowledge of the Bighorn, till now that it is threatened with extinction in the United States, we have achieved a very comprehensive knowledge of its habits and ancient homeland.

Horns and Record Heads

The marvellous curling horns of the rams were apparently the first things to catch the eyes, and rivet the attention of these early historians. Without exception, they comment on them.

The horns of the ram are the coveted trophy of the sportsman; for they are the creature's peculiar gift and crowning glory, his one distinguishing and imperishable ornament, the record of his size and of his life.

The illustrated series shows how the animal's age is notched on his horns. Only a ram who has had a superbly successful life, can show such horns as are represented in Plate LXXVII. He must have been a noble animal, gifted at the outset with a robust constitution; or he could not have grown them so massive. To have outwitted his enemies long enough to have achieved that length, he must have been wise and crafty above his kind.

A horn that measures 36 in. around the outside curve, from base to tip, and 15 in. in girth at base, must be considered in the highest class.

In Rowland Ward's "Records of Big Game," 1922 edition (pp. 383–84), are 36 that are more than 36 in. in length; 14 of these are of 40 in. and over; 21 are 16 in. or more in girth.

A record for length is 49 in., with a girth of 16 (owner's measurements). It was taken on the Clearwater of Idaho; it is owned by J. Simpson. A good second is J. B. Marvin's Alberta head measuring: Length, 48 in.; girth, $18\frac{1}{8}$ in.; spread 23 in. (owner's measurements).

The record given here for girth is a British Columbian head of 19 in. with a spread of 15; but the horn is only $36\frac{3}{4}$ in. long (owner's measurements). The owner is C. H. Kennard.

The best head measured by Rowland Ward himself was taken in Alberta by H. E. Knobel. It measured: Length, $42\frac{1}{2}$ in.; girth, $18\frac{1}{4}$ in.; spread, $22\frac{3}{4}$ in.

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[6]See also Dr. J. A. Allen's paper, in the references.

In *Forest & Stream* for June 1, 1895, the following notable heads are recorded by the Boone and Crockett Club Committee, who examined and measured them:

Geo. H. Gould, length, 42½ in.; girth, 16¼ in.; spread, 25¾ in.; Lower Calif.
G. O. Shields, length, 37¾ in.; girth, 16¼ in; spread, 22½ in.; Ashnola, B. C.
C. G. Gunther's Sons, length, 33½ in.; girth, 17¾ in.; spread, 21 in.
Theodore Roosevelt, length, 29½ in.; girth, 16 in.; spread, 18½ in.; Little Missouri River, Sept., 1887
T. W. Fraine, length, 30 in.; girth, 16 in; spread, 26 in.; Purchased from a dealer.

On July 7, 1906, I received from Belmore Brown of Tacoma, the details of 3 remarkable Mountain Sheep heads that he had just examined in the collection of W. F. Sheard.

1st Rt. Horn 43 in. long; 17⅜ in. girth (about 6 in. broken off the tip)
Lt. Horn 43¾ in. long; 17¼ in. girth
2nd Rt. Horn 38½ in. long; 17½ in. girth
Lt. Horn 35 in. (broken off) 17⅝ in. girth
3rd Rt. Horn 34⅜ in. long; 17½ in. girth
Lt. Horn 35 in. long; 17⅝ in. girth

The following are recorded in Rowland Ward's book (p. 384). All are owner's measurements.

Length on front curve	*Girth*	*Spread*	*Place*	*Owner*
49	16		Clearwater	J. Simpson
48	18⅛	23	Alberta	J. B. Marvin
47⅝	16⅛	23	Do.	W. Grant Mackay
45½	14½	22	Do.	J. D. Hazen
45½	16		Near Banff	J. C. Phillips
44½	17	21	Near Golden, B. C.	Madison Grant
43⅛	16¾	18½	British Columbia	Wilson Potter
42½	16¼	25¾	Lower California	Am. Nat. Coll.*

*Taken by Geo. H. Gould, Oct., 1894.

Baillie-Grohman records that out of 70 or 80 Bighorns that fell to his gun, the largest was a ram whose horns were each 19 in. in girth.[7]

[7]Camps, p. 161.

Rufus B. Sage writes that not far from Long's Peak, Nov. 10, 1843, he killed 2 Sheep whose horns were 19 in. in girth and nearly 3 ft. long. But he does not produce the specimens.[8]

Dr. W. J. Holland of Pittsburgh has a head that is, at least, in the record class, if not at the head of it. In 1910 I saw and examined this. It is as follows:

Right horn 43 in. (both horns had lost 2 or 3 in. by a break); girth, 17. These measurements were taken between 25 and 30 years after the specimen was shot, so the doctor is undoubtedly right in claiming for them an original basal girth of 18½ or 19 in. This ram was killed by Howard Eaton in the Badlands in Oct., 1880.

John M. Phillips of Pittsburgh writes me that he has a head whose horns measure but 17 in. in girth now, but which measured 18½ when worn by the living ram; and he is of the opinion that the horns of the Holland head were fully 18½ in. in girth originally. A final claim for the ram record is made by August Gottschalck on behalf of his Montana armoury head now in the possession of Fred Klein of Hoopeston, Ill. Length, 41 and 41¼ in., girth, 17⅜ and 18½ in., spread at points, 18¾ in.; weight dried 30 lbs.

A ewe taken by John Muir northeast of Shasta near the Modoc lava beds, had horns that measured 11½ in. long, and 6 in. in girth each. This appears to be near the record for a female, as the longest in Ward's book is 10½, with a girth of 5½.

A ram's horns should be measured as soon as secured. Horns shrink surprisingly as they dry out. In one year they will shrink an inch to an inch and a half, that is 5 to 10 per cent. in girth; somewhat but not so much in length.

The big ram taken by N. Hollister in the Mt. Robson region, mid-September, 1911, had a horn girth of 17⅞ in. in the field, but only 16½ in. when it got to the Museum. As these were careful measurements with a steel tape, it shows how much the horns may shrink in 7 months.

These facts shed light on some apparent inconsistencies. In perfect good faith, some sportsman announces that he secured a pair of 19-in. horns 10 years ago; and when the doubting critics apply the tape, and find them but 17½ in., the sportsman is unfairly put in a wrong light.

Weight of horns. Audubon's great ram head weighed 44½ lbs. Geo. F. Dippie, of Calgary, showed me one that weighed 43½ lbs. L. L. Dyche

[8]Rocky Mt. Life, p. 347.

says: "The horns and skull of the largest Sheep I ever saw, weighed, when thoroughly dry, 28 lbs."[9]

The Horns and Old Age

When one examines the horn-rings—the yearly notches on a ram's horns—one is struck by the fact that all the best horns have but 7 or 8 years' growth. After that, what?

It seems that the apex of vigour is then reached; for thenceforth the mighty masses that commanded success in the battle for wives and descendants, are become a burden with nothing to offset their weight. How gladly would the ram shed this useless load of junk if he could; and, like some Elk who is past his prime, wear a modest headgear—one reflecting more accurately his powers.

A quaint and partly true picture of the old ram, encumbered and handicapped by the glory of his youth, is offered by Alexander Henry, the garrulous old fur-trader and explorer who loved to handle a pen almost as much as he did a gun or paddle. On page 697 of his famous Journal, when in the land of the Kootenay, 1811, he wrote:

"At Rivière du Meurleton (Mirliton) we saw a herd of . . . old rams with enormous horns; one of them appeared to be very lean, with extraordinarily heavy horns, whose weight he seemed scarcely able to support. When the horns grow to such a great length, forming a complete curve, the ends project on both sides of the head so far as to prevent the animal from feeding; which with their great weight, causes the Sheep to dwindle to a mere skeleton and die."[10]

Broken Tips

The points of the Bighorn's horns are rarely entire; most have some inches missing. E. H. Ober maintains that this is caused by the horns being used to dig out roots among rocks, especially in seasons of drought, at which times in the Piute country, the sequaw root furnishes drink as well as food.

He says, further, that, as a consequence, "It is a very rare instance, indeed, to ever find a desert Nelson Sheep ram, in this locality, which has not the tip end of one or both of its horns broken; and it is an equally rare occurrence to find a Sierra Sheep with other than a perfect set of horns."[11]

Charles Sheldon, however, does not accept this. He tells me that he

[9]Campfires of a Naturalist, 1893, p. 145.

[10]Journal, II, p. 697.

[11]Pac. Coast Golf and Outdoor Sports, Jan., 1913, p. 26.

is sure that it is the combat of the males that breaks the horn tips. They are splintered by the terrific jar, even when the tips themselves do not actually strike in the fight.

And it would surely be very unfair to the ewes if they could not dig up a drink, as well as the rams.

An Hermaphrodite

Baillie-Grohman assumes responsibility for the following:

"It was the good fortune of one of the men to kill, three years ago, an hermaphrodite Bighorn, with very singular horns. Passing twelve months afterwards, near the place where he killed it, I was anxious to secure the head, but it was gone; Coyotes or Wolverines having probably carried it off. According to the description given to me, the horns resembled those of a two or three year old Ibex, lacking, however, the 'rings' peculiar to the latter's headgear."[12]

In this connection, it is well to remember also that the legend of the "American Ibex" or Straight-horned Sheep is founded on nothing more than the ewe, or sometimes the 2-year-old ram, of the Bighorn.

Horns on Trees

It seems that at one time, it was the custom of the Indians to hang Sheep horns on trees—to mark the spot—to make a kind of monument. I remember hearing a tradition that the hunting grounds of the Blackfeet were demarked from those of the Shoshones by a "horn-tree."

Two such trees have been cut down, and the embedded horns added to collections of the curious. A picture of one appears in *Forest & Stream* for April 11, 1896, with this notice:

"I send you photos of a Big-horn head imbedded in a large green, quaking-asp tree, found on Porcupine Creek—tributary of upper West Gallatin River—Gallatin County, Mont. The tree was near a rocky ledge or wall. As you will notice on the photo, the skull is completely imbedded." (Aug. Gottschalck, Bozeman, Mont.) (Plate LXXX.)

On Jan. 28, 1914, I saw in the store of J. P. Evans of Livingston, Mont., a horn-tree with two pairs of ram's horns embedded in the wood.

Glands

An obscure but interesting feature is the gland that is found under each eye. It secretes an unctuous, waxy stuff with the peculiar sheep-

[12]Camps, p. 420.

smell of the race quite strong. It probably has to do with a system of smell signals. The gland, with the corresponding depression in the bones beneath it, is much more developed in the Asiatic Bighorns. This further advancement of Eurasian species, compared with those of smaller areas, seems to be a law.[13]

Pads

Another detail of the Bighorn equipment for the life battle was observed by Bailey among the Sheep of Texas.

He says: "Among other peculiarities noticed in the fresh specimen are the pads of the breast and the knee, where the skin had developed to an almost cartilaginous shield over a quarter of an inch thick, and so hard that it was not easily cut through with a sharp knife. The whole sternum and front of the knees were thus protected, and for very evident reasons.[14]

Hitherto, the Camel has been supposedly the inventor and exclusive wearer of the rubber knee pads. But, after all, the Texan Sheep lives in Camel climate; so why not Camel fashions?

Domestication and Hybridity

All available evidence seems to show that the Bighorn might be easily domesticated. Yet so far as recorded, no one has done it, or even tried it; except, perhaps, in the Washington Zoo where the experienced head keeper, W. H. Blackburne, has bred and raised a number of lambs.

In the N. Y. Zoological Society 5th Annual Report (1901, pp. 114–15) is a brief note stating that Dr. Hyer of Halle-on-the-Saale, Germany, had succeeded in crossing Bighorn male with Mouflon female and vice versa, that the crosses are interfertile, and will breed with the domesticated Sheep.

Range and Haunts

Map VI shows the remarkable range of the Brown Bighorns, from north latitude 55° almost to the tropical region that puts a red tip to the southern end of the Californian peninsula. North of 55°, the Brown Bighorn is displaced by the Thin-horned group.

Over this immense area of 2,000,000 square miles, wherever mountainous, the Bighorn was plentifully distributed as late as 1870. Even such outlying groups as the Black Hills of Dakota, the Blue Mountains of Oregon, and the San Francisco Peak of Arizona, were fully stocked with the great Brown Sheep.

[13]See Evolutionary Force of a Wide Range, by E. T. S., Journ. Mamm., Aug., 1922, pp. 167–69.
[14]Texas, p. 73.

All the ancient records, and all the old-timers that I have consulted, tell that this creature was not originally a cliff-dweller. Its feeding grounds were the grassy foothills and bluffs not far from the crags. It would follow along the river bottoms to graze, but was ever ready to fly to the rocks for protection.

It was not gifted with speed, or weapons, or fighting strength; nor could it find shelter underground like so many of the otherwise defenceless. But this it had—the power to bound up a sheer and rugged cliff that was impossible to any other big creature in its range—except, perhaps, a Cougar or a White Goat.

To-day, all that is changed; the pressure of new perils has driven the Wild Sheep permanently to the high mountains. It is now a mountaineer. Nevertheless, it does, at times, set out across the level country to seek better forage. Its keen eye takes in mountains five to ten miles away; and the wise old ewe will strike out with her band, if she must, and make her way to the far, fair pastures she has spied out from some peak.

Another exception to the rugged upland habit, according to Baillie-Grohman, "occurs after rutting time when the rams, in very poor condition, will wander from their crags to the level plain land, where the rich bunch grass helps to recuperate their strength. Especially if snow has fallen on the higher ground will they be found feeding, sometimes as much as a mile from the base of the next mountain chain. I often saw, in the month of December, small bands grazing in this manner; but so watchful are they on these occasions—an old doe being constantly on guard duty on the most prominent knoll—that it is most difficult to approach them within shot."[15]

One other of the great forces of nature has been enlisted by the Bighorn; that is, thirst, the terror of the desert.

T. S. Vandyke tells me (Oct., 1899): "The favourite home of the Sheep is among the most rugged and arid of the desert peaks. It is absolutely impossible for man to follow them there. No matter what his strength, his skill, or his endurance, the still-hunter is worn out by the fearful heat and the excessively dangerous climbing among the slide rock and friable clay-bluffs long before he has a chance of success. The only way in which they are ever killed is by lying in wait at a water-hole, and murdering them as they come to drink."

And this is rarely done, for the Sheep come to this death-trap only in the hours of gloom; and in many parts of the desert, as will be seen, they have learned to dispense with water altogether.

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[15]Camps, p. 164.

Primitive Abundance

The early explorers of its region, mention the Sheep as often as they do the Deer. Though probably not to be compared in number with Buffalo, Antelope, or even Elk, there can be no doubt that the Bighorn existed in millions in palmy days of Coronado.

That enterprising, bigoted, but heroic and epoch-making traveller, tells of the Great-horned Sheep that he saw in his famous journey through Arizona and New Mexico in 1540; but does not say how numerous they were.

Lewis and Clark's first reference to the Bighorn—and presumably first sight of them—is when they reached the Yellowstone, May 25, 1805. From this on, there are numerous mentions. On May 28th, near the mouth of Judith's River, they saw "the Bighorn in great quantities, and must bring forth their young at a very early season, as they are now half grown."[16]

Next day they add, "There was a great abundance of the Argalea or Bighorned animals in the high country through which it [The Judith River] passes."[17] After this, for a time, the Bighorn was the most abundant of game.

All mention of them ceases after August 1st, and until April 12th when among the West Coast tribes, the Clakclellahs, near the mouth of Cruzatte's River. The next mention is June 2d, when, on the return journey, they were back to the Tommanamah or east branch of Lewis River. After which the Sheep once more abounded and became a staple of diet; especially about the mouth of the Bighorn River, where they remark that it was the abundance of these animals which gave the river its name.[18]

Their last mention of the Bighorn is when the travellers were near the mouth of the Yellowstone on their way back.[19] This was evidently the greatest of all Bighorn countries. Here we find a tribe called "the Sheep-eaters," who lived on the Sheep, as the Plains Indians did on the Buffalo. Here, indeed, we learn from eyewitnesses that the Bighorn existed in thousands.

Zebulon M. Pike mentions, in his "Exploratory Travels through Lousiana" (p. 218, 1889 ed.), that on Jan. 1, 1807, he "found on the way one of the Mountain Rams which the Doctor and Brown had killed and left on the road. Skinned it with horns, etc." But I find no other mention in his record.

[16] Exped., I, p. 249.
[17] P. 250.
[18] As above, II, p. 413.
[19] As above, II, p. 423.

We have no appraisal of the abundance of Sheep in the Southwest, that is Coronado's country, until we find that of J. O. Pattie, who crossed Arizona in 1825, and tells that, on Jan. 1st, he saw "multitudes of Mountain Sheep" on the banks of the San Francisco River, which rises near the same sources as the Helay, that is Graham Co., Arizona.[20]

On the Upper Platte near Sweetwater Hills in Central Wyoming, Capt. J. C. Fremont writes, July 30, 1842: "We saw here numerous herds of Mountain Sheep, and frequently heard the volley of rattling stones which accompanied their rapid descent down the steep hills. This was the first place at which we had killed any of these animals; and in consequence of this circumstance and of the abundance of these Sheep or Goats (for they are called by each name) we gave to our encampment the name of Goat Island. Their flesh is much esteemed by the hunters, and has very much the flavour of the Alleghany Mountain Sheep."[21]

Rufus B. Sage refers once or twice to killing Sheep in his exploration of the foothills west of Denver in 1844; but the inference is that they were less numerous than the Deer there.[22]

George F. Ruxton, writing in 1847, says of the Bighorn: "They are generally very abundant in all parts of the main chain of the Rocky Mountains."[23]

Newberry's account (1857) says: "On the slopes and shoulders of Mount Shasta, the *Ovis montana* exists in large numbers; so much so, that one spur of the mountain has been named "Sheep Rock"; and there hunters are always sure of finding them."[24]

W. H. Brewer found Sheep common on the mountains surrounding South Park in 1871, and states that they are particularly abundant above the timberline on the highest peaks.[25]

John Muir told me in conversation (Oct. 2, 1899) that the High Sierra from Whitney northward used to be full of Sheep. In 1874, they were numerous south of Rhett Lake, and common on Shasta. Sheep Rock used to be a common winter ground for them. Near Mt. Humphrey, on the San Joaquin River, he once saw over 40 in a flock.

Abe Leeds of Hamilton, Mont., was my guide in 1902. He was a reliable old-timer; and assured me that, in 1884, there were thousands of Sheep on the Lost River, which is an affluent of the Snake, and crosses

[20]Narrative, 1883, pp. 55–56.
[21]Explor. Exped. Rocky Mts., 1842, pub. 1845, p. 56.
[22]Rocky Mt. Life, 1857, pp. 347, 351.
[23]Wild Life in the Rocky Mts., 1916 ed., p. 207.
[24]Pac. R. R. Report, 6, 1857, Zool., p. 72.
[25]American Naturalist, V, 1871, p. 220.

the Red Desert of Idaho. Also in 1886, when, in the Bighorn country, Sheep were more plentiful than any other game, he had seen 500 in one day, usually in small bands of 15 or 20.

Prof. D. G. Elliott says that, in 1886, he made a hunting trip into Yale Co., British Columbia. Starting from Hope on the Fraser River, he crossed part of the Coast Range to Ashnola. He found great numbers of Sheep and Mule-deer. On one occasion, a procession of over 150 ewes, lambs, and small rams, all led by an old ewe, filed past him at 75 feet distance.[26]

W. R. McFadden of Denver, tells me that about 1892, he saw 57 ewes and lambs in a band on Crater Mountain in British Columbia, about 18 miles north of the Washington line.

M. W. Miner writes in 1897: "It is estimated there are between 2,000 and 2,500 Mountain Sheep, now inhabiting the slopes and mountains of the middle Fork of Salmon River, mostly in the vicinity of the upper end of the Great Canyon, which is about 60 miles from the main Salmon River. . . . Two trappers who wintered in that country last winter told me . . . it was almost a daily occurrence to see bands of 60 to 100 feeding on the bare hill sides."[27]

On Feb. 11, 1899 (p. 110), W. L. Simpson writes to *Forest & Stream:* "Some 400 head of Mountain Sheep, mostly ewes and lambs, are wintering on the Big Gros Ventre, Jackson's Hole."

Population in Those Days

Some idea of the primitive number of Sheep may be formed from the population in Glacier National Park. In 1916, I spent some weeks camping in the Park, and after using all sources of information, calculated that the 2,500 square miles of the Park contained not less than 1,500 Sheep. In the official Report[28] this estimate of mine was raised to 2,000, or about 1 Sheep to the square mile of this possible territory.

The Park is far from ideal range. It contains very little true Sheep pasture of the kind that they sought a hundred years ago. One can travel about a whole month, as I proved in 1916, and never see a Sheep. In the Big Horn Basin, judging by Lewis and Clark's accounts, and those of later travellers, Sheep may have been ten times as numerous as the above Park estimate. Offsetting this, however, is the sparse population of the arid desert regions. So that it is very safe to assume the primitive number

[26]Allen, N. A. Sheep, p. 25.

[27]Recreation, Oct., 1897, p. 301.

[28]Wild Anim. Glac. Pk., Dept. Int., 1918, p. 27.

at between 1,500,000 and 2,000,000. This, of course, does not include the Slim-horned Sheep of the north, whose numbers may be at least as great.

The Remnant about 1900

"The last Mountain Sheep was killed in Shasta Valley by George Conner on a Sunday morning in 1873."[29]

The Sheep were practically cleared out of the Black Hills about 1887, though according to Howard Eaton, a few lingered on till 1899, when the last one was killed.

G. B. Grinnell says: "W. S. Phillips has kindly informed me that about June of that year [1890] he saw 3 sheep on Mt. Inyan Kara."[30]

Prof. E. C. Bishop of Ames, Ia., assures me that in Aug., 1897, he saw 8 Mountain Sheep on Sheep Mountain, 50 miles northwest of Pine Ridge, and 50 miles east of Buffalo Gap. He got within 300 yards of them.

Edwin Carter, of Breckenridge, Colo., told me in 1899 that the few Sheep on Pike's Peak were all that remained in eastern Colorado.

Judge D. C. Beaman, of Denver, was less pessimistic. He told me (1899) that he believed there were yet Sheep in most of the Colorado Mountains; and that, thanks to protection, there were twice as many as ten years ago.

John Muir assured me that in 1899, there were still a few Sheep about Mt. Whitney and in the Yosemite.

In July, 1902, I spent some time at Pine Ridge, S. D., riding and camping with Dr. James R. Walker. He stated that Mountain Sheep were still found in the region—that there were 3 bands of less than a dozen each on the Indian Reserve. They frequented the impassable Badlands along White River. He showed me 4 specimen heads, and gave me the best of them; this I sent to the National Museum.

That same summer, I visited the Black Hills, and was assured and convinced that there were no Sheep left there then. The few that were still holding out in the Badlands were all that Sam Day, the taxidermist, had heard of for some time.

In 1902, Dall de Weese estimated the total number of Sheep in Colorado at 700.[31] In 1910, E. R. Warren wrote: "They are gradually increasing in number."[32]

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[29]Wm. Russell, Cal. F. & G., July, 1916, p. 125.
[30]Amer. Big Game, Boone & Crockett, 1904, p. 334.
[31]Merritt Cary, N. A. F., 33, 1911, p. 63.
[32]Mamm. Colo., p. 10.

In western Texas, Bailey was assured by an old resident of one of the canyons, a man who had supplied his table with wild mutton for many years, that he considered Bighorn fully as numerous at that time (1905) as fifteen years before.[33]

Present Numbers

In the Yellowstone Park, the Sheep, of course, hold their own. When I lived there in 1897, there were about 150 Sheep in the Park; in 1914, there were 210; and in 1922 there were supposed to be 300.

When I was in the Glacier National Park in 1916, I concluded from the evidence of the guides that there were about 1,500 Sheep within the boundaries. As already noted, these have steadily increased, and now number probably 2,500.

The estimate for 1915 was 7,230 Sheep in Colorado alone; that is, ten times as numerous as they were 20 years before.[34]

In California, also, an encouraging condition prevails. About 1900, I was assured that the Bighorn was extinct except in Lower California. Some few hunters believed that there was a scattered remnant in the Desert Mountains; but their extinction was practically accomplished. Then came the era of awakening, followed by good game laws, and a measure of enforcement as well as some sanctuaries; with the result that the Sheep are increasing in many localities.

E. H. Ober, Assistant Game Commissioner of California, wrote in 1915, that flocks amounting to over 150 had been seen recently on the eastern slope of the White Mountains, about 20 miles east of Independence. Homestake Canyon is their watering place during the summer months.

"East of Homestake Canyon," he continues, "and across Saline Valley twenty miles to Hot Springs, and around Sand Springs and Last Chance Mountain, Mountain Sheep may be found everywhere. Also on Ubehebe Mountain, lying east of Saline Valley, Mountain Sheep are very abundant, and south of Ubehebe Mountain for 100 miles; all through the Funeral, Argus, Panamint and Slate ranges of mountains, they abound. They are most numerous, however, in Inyo County, in the above-named mountains, and in and around 'Windgate Pass' and the Sheep Mountain country, and on the western slope of Tin Mountain northeast of Ubehebe Mountain.

"Directly east of Big Pine, about 30 miles, there is a very beautiful herd; the writer, on several occasions having seen as many as 40 at one

[33]Texas, p. 71.

[34]Boone & Crockett Report.

time. . . . Very reliable reports reach me concerning their splendid increase each year.

. . . . . .

"In the Sierras, running through Inyo County, there are three herds of Mountain Sheep [*sierrae*], and these are a distinct and much larger variety than the Desert Sheep. People generally are not aware of the existence of these Sheep, as they are found high up in cloudland, and above the localities frequented by man. The largest herd known in the Sierras can be found northeast of Independence, and about ten miles away; the writer has observed this herd upon many occasions, and their number is in the near neighbourhood of 85 to 90; 65 having been counted at one time this last winter, at the base of the mountains touching the valley, and within a stone's throw of an automobile road; thus refuting the popular notion that Mountain Sheep do not change their altitude, regardless of weather conditions.

"The herd next in size, may be found about twenty-five miles west of Bishop City, on Mount Tom; and numbers about 40 or 50 head."[35]

To this he adds:

"Last spring, while collecting some specimens for the United States Biological Survey, I was able to make a close study of one of the large herds of Sierra Mountain Sheep ranging north of Independence, Inyo County. I had previously estimated the number in the vicinity of Mount Baxter to be about 80; but during a two-weeks' trip, we saw at least 200 individual Sheep, and doubtless . . . many others [were] ranging in the near vicinity. Including the Nelson Mountain Sheep, which inhabits the desert ranges, there must be in the neighbourhood of 1,500 Sheep in Inyo County alone."[36]

Prof. Leon L. Gardner, writes: "That Mountain or Bighorn Sheep still exist in small bands in various parts of the California Mountains is a fact well known. It, however, comes as a welcome surprise to find them living, breeding and at least holding their own in numbers, in the mountains not farther than thirty miles from Los Angeles. Vague reports from old hunters that in certain parts of the ranges near Mount San Antonio, commonly known as 'Old Baldy,' there were 'Wild Goats and Sheep'; and that they were 'mighty hard to get near to,' furnished the incentive for investigations which have demonstrated that one species of Bighorn Sheep occurs in the ranges north of Claremont, Los Angeles County. Whether or not this is the Nelson Bighorn (*Ovis nelsoni*) is an open question which can be

[35]Forest & Stream, Oct., 1915, p. 228.

[36]As above, pp. 236–37.

decided only by the collection and study of specimens."[37] On June 12, 1915, he saw 3 Sheep near "Old Baldy."[38]

In Sept. 1914, he says, "a whole band was seen on Ontario Peak." On p. 20 he adds: "Regarding the numbers of Sheep living in this territory it is not possible to say definitely. If all the Sheep are in one band, then their number is between 50 and 60 head."

In 1912, Charles H. Townsend wrote that Sheep were still commonly found throughout the desert ranges of Lower California.[39]

In 1915, a committee of the "Boone & Crockett Club" of N. Y., made a valuable report on the number of Sheep still existing in America, as follows:

"In the fall of 1913, probably 3,000 or 4,000 or more exist in the Desert ranges of Arizona. Some still remain in the Santa Catalina Mts., north of Tucson. Though protected by a close season, prospectors, Indians, and others going into the mountains indifferently shoot them for meat. In spite of this, they are holding their numbers. More investigations in the Grand Canyon, corroborate the numbers suggested in the Committee's last report.

"In California, Nelson's Sheep exist in numbers in the mountains about Death Valley, and in less numbers along the lower Colorado River. Here, for thirty years the Sheep have at least held their own. In the high Sierras running through Inyo County, some 200 Sheep have been observed in different bands. There are probably many more. There are Sheep in the San Jacinto Mountains.

"Mountain Sheep were formerly abundant in the Warner Mountains and the Steen Mountains in south central Oregon, but a careful search in these ranges in 1914 failed to discover any traces of them—only vague reports of their presence. In limited areas in eastern Oregon there are still fair numbers of them in certain localities. In Nevada, small numbers exist in nearly all the desert ranges in the southern part of the State. Small numbers are also known to range in the Toiyabe range in central Nevada, in the east of central Nevada, near the Utah border, and perhaps in the extreme north central section. Sheep are being illegally killed in Nevada more rapidly than elsewhere. The conditions there are not hopeful for their survival.

"In Colorado, Sheep seem to be increasing, and in some parts of the State, have become extraordinarily tame, even coming down the moun-

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[37]Cal. F. & G., Jan., 1918, p. 17.

[38]As above, p. 17.

[39]Bull. Am. Mus. Nat. Hist., Vol. XXXI, Art. XIII, p. 119.

tain-sides in winter to feed in the towns and about the ranches with the Cattle. These Sheep may eventually afford a supply to restock other areas of the country. The Forest Service estimates that there are 7,230 Sheep in the National Forests of Colorado. . . .

"In Wyoming, Sheep are believed to be slowly increasing, especially in the north and south forks of the Shoshone River in the game preserve. In the Bonneville National Forest, the severe winters, poor winter range, and predatory animals seem to be causing a decrease. The Forest Supervisor there reports that he commonly finds Coyote tracks following the trail of Sheep in the snow. A small band still exists, and there are about 160 on the Big Horn Mountains. They appear to have become extinct with the last year on the Medicine Bow Peak. In the Yellowstone Park, the number is about what it was [300].

"A few Sheep still exist in Texas and New Mexico. For the present, Sheep should enjoy a close season everywhere in the United States. Large numbers of Sheep occupy the desert ranges of Lower California, extending almost the entire length of the Peninsula. Large numbers are found also on nearly all the ranges of Western Sonora, growing scarcer a hundred miles south.

"It is clear that, in the United States, desert Sheep hold their numbers better than the northern variety."[40]

W. P. Taylor, reviewing the 1916 Game situation in California, says, "At present the Desert Sheep is apparently increasing in some sections of its range, notably the desert ranges in Inyo County; and stationary or decreasing in others, as in the desert portions of the more southerly counties, San Bernardino, Riverside and Imperial. There are, fortunately, some large bands which promise well, and which at least indicate that there is no cause for concern over the immediate future of the species within the State."[41]

During the winter of 1921–22, I lived near Victorville, Calif., on the Mohave Desert. From the talk of the settlement, I gathered that Sheep were much more abundant than Deer, and easier to get. Dr. Harry Garcelon told me, indeed, that, Sheep were yet to be found in fair numbers, on all the surrounding mountains, especially the Ords, the Funeral Range, and the Calico Range. He had often seen them. About a year before, he saw a band of 12 or 14; and promised definitely that if I would come back in August when most of the water tanks are dry, he could show me 50 Bighorn Sheep within one week.

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[40]Report, pp. 20–23.

[41]Scientific Monthly, Oct., 1916, p. 405.

In Utah, condensing the account of Claude T. Barnes,[42] there are 106 Sheep on the whole Uinta Mts.; about 25 head near Springdale, Washington Co.; about 400 in the Ashley Forest; a few on Granite Mt., Tooele Co., and a few along the canyons of the Green, Grand and Colorado rivers, especially along the Grand River near Moab,—probably a round 1,000 in the State.

The estimate made by the Biological Survey, of 10,000 as the total of Mountain Sheep in the United States in 1920,[43] seems to me obviously too low.

On the strength of the material presented here, supplemented by general information from hunters, and finally adding the official census figures of the game in the National Forests in 1922, I estimate the number of Sheep existing in the United States as follows:

Arizona	3,500
California	3,500
Nevada	500
New Mexico	500
Utah	1,000
Colorado	8,000
Texas	500
Wyoming (incl. Yellowstone Park)	4,000
Montana (incl. Glacier Park)	5,000
Idaho	1,500
Total	28,000

From all accounts, there are fully as many as that in northern Mexico, and lower California where the "Boone and Crockett" committee reports them in "large numbers."

In Canada and Alaska, where they continue in nearly primitive numbers, there must be fully, 2,000,000 Wild Sheep, all species included.

Home Range

The Sheep are very clannish. A certain flock roams on a certain upland, and although, at some seasons, the rams are apart, they are not on a different range. They seem to keep in touch with the herd, which is composed of ewes, lambs, and spike-rams; that is, those not yet arrived at full ramhood.

[42]Mamm. Utah, 1922, pp. 26–28.

[43]Bull, 1049, U. S. Dept. Agri., 1922, p. 24.

Like all our Big Game in the snow-lands, the Bighorns have two ranges —one for summer and one for snowtime. The only direct observation I have to fix the extent of these, was made in Yellowstone Park, where something like primitive conditions have been restored.

There are two well-marked herds there that I observed, and followed about,—the Washburn herd of about 25, and the Mt. Everts of about 50. In the summer, they could always be found within 2 or 3 miles of their headquarters, which was the highest part of their not very high mountain. In snowtime, they descended much lower, and sought the sheltered hillsides.

The Mt. Everts flock is well known in winter along the canyon of the Gardiner River. These animals do not go two miles from the point halfway between Mammoth Hot Springs and Gardiner. The tenacity with which the Bighorn clings to its home range reminds one of the intense localism of the Highland clans. Charles Sheldon says of the White Sheep, that they live and die on their home range, and if driven off temporarily, return as soon as possible.[44]

One advantage of this attachment to their range is that the Sheep are thoroughly versed in all local conditions. Especially is this true of the old ewe who is their "bell-wether." She knows all the places of shelter from a storm; she knows where to find choice foods in time of scarcity; she knows every drinking place, as well as the salt-licks and the semi-salt-licks. Above all, she knows every trap, every jump-off, every sheep-ladder, every shoot that is possible for a Sheep, but beyond the powers of Wolves, Bears, Cougars, Dogs, or humans. Amply equipped is she, therefore, when pursuit becomes unpleasantly stimulating, to lead the swiftest foe on a fool's errand, to take excellent care of herself, and incidentally of those that have the wit to follow her.

Food

The Bighorn is a delicate feeder. When one sets in parallel columns the food-stuffs of Elk, Deer, and Bighorn, one is slightly shocked to see what a variety of crude, rough, woody, or rank-smelling and -tasting things the Deer folk will eat. The Bighorn, on the other hand, eats nothing but the sweetest and most delicate of hillside or mountain grasses and flowers. This rare combination of niceness with sweetness seems to bear fruit in the delicacy of its flesh.

Most of the close observing hunters describe the Mountain Sheep as strictly a grass-eater. A. A. Anderson tells me that in the Bighorn Basin,

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[44]Wilderness Upper Yukon 1911, p. 303.

the Sheep never browse; their food the year round is grass, even when they must paw for it under the snow.

Bailey, however, writing from Texas of specimens taken in early August, says: "The stomachs of the two Sheep killed were full of freshly eaten and half-chewed vegetation, and most of the plants composing the contents were easily recognized by the stems, leaves, and fruit. The leaves, twigs, and carpels of *Cercocarpus parvifolius* formed a large part of the contents, while the leaves, twigs and seed pods of *Philadelphus microphyllus* were present in less abundance. The seeds, stems, and leaves of the common wild onion of the mountain slopes were abundant and conspicuous in the mass, giving it a strong odour, while the black onion seeds, still unbroken and often in the capsules, were especially noticeable. A few bits of stems and leaves of grass were found in each of the stomachs, but they formed probably not over 2 per cent. of the total mass."[45]

A 7-year-old ram was taken soon after in Western Texas. Concerning its stomach he says:

"Over half of the contents was composed of the green stems of *Ephedra trifurcata*, which I at first mistook for grass, but which could not be mistaken on careful examination. The stems, leaves, and flowers of *Tecoma stans*, a beautiful yellow-flowered bush, were conspicuous, as also were the leaves, stems, and berries of *Garrya wrighti*. A few twigs with leaves and fruit pods of *Pentstemon* were found, and a quantity of ripe fruit of *Opuntia engelmanni*, including the chewed-up pulp and seeds of at least half a dozen of the large pear-shaped berries. Some other leaves and stems were found that I could not recognize, but a careful search failed to reveal a trace of grass in the stomach."[46]

Game Commissioner E. H. Ober, says that "their food consists of the tender shoots of growing brush, and their favourite dessert is the most delicate ferns and flowers."[47]

But Prof. Leon L. Gardner, of Pomona College, Calif., has given some details that are new and helpful. He says: "The following plants form an important part of the [Sheep's] diet: the leaves of the Chinquapin (*Castanopsis sempervirens*), a wild parsnip (*Palpinacea sativa*) growing around waterholes, berries of the manzanita (*Arctostaphylos*), twigs and leaves of *Rhus trilobata* and *Rhamnus crocens Californicus*, and finally grass growing near springs and streamlets."[48]

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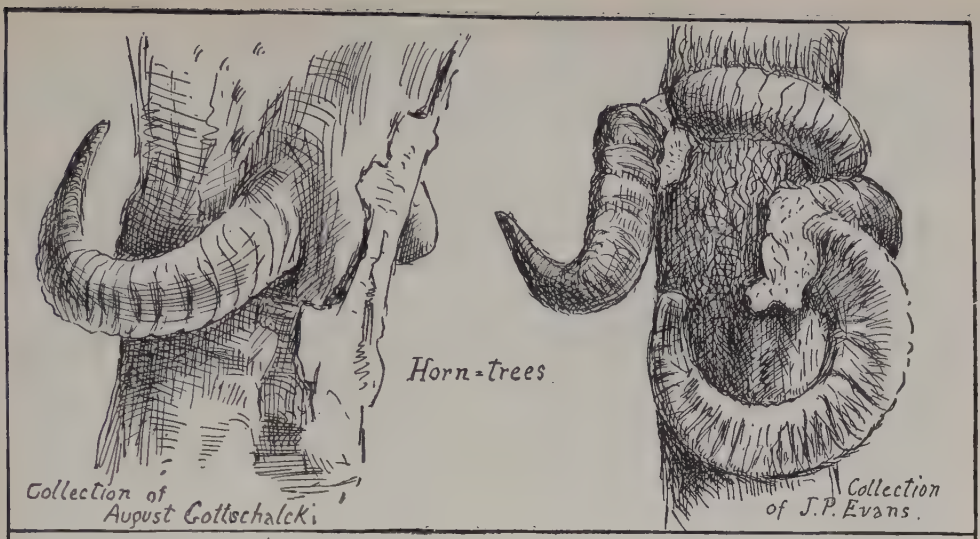
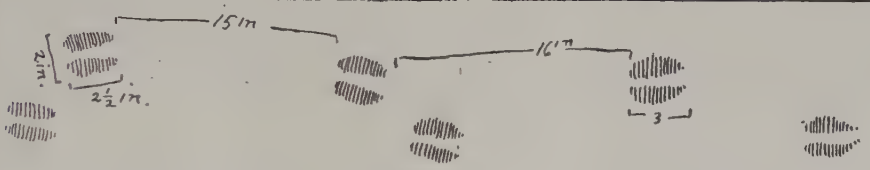
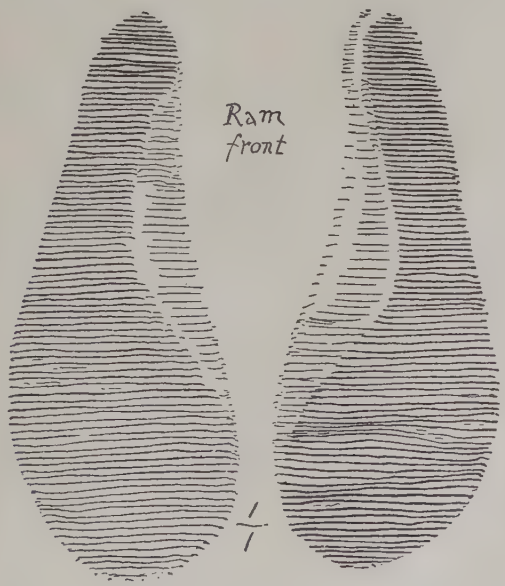
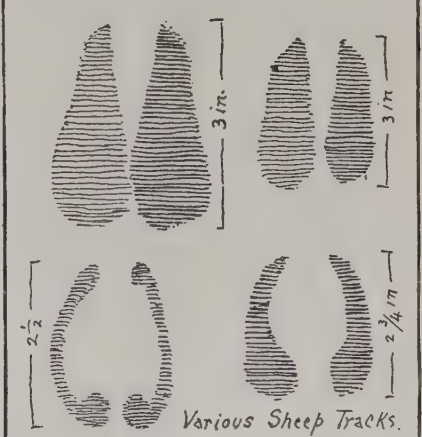
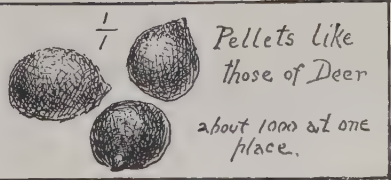
[45]Texas, pp. 71–72.
[46]Texas, pp. 74–75.
[47]Forest & Stream, March, 1915, p. 228.
[48]Cal. F. & G., Jan., 1918, p. 20.











E. T. Seton.

Plate LXXX. — Details of Bighorn. Tracks, etc.

The dwarf ram collected by Sheldon (March 10, 1916) in the Rosario Mts. of Sonora, was shown by the one unquestionable proof, to have eaten the following:

"Ground cherry (*Physalis*)—many seeds and a few husks; Joint-fir (Popotillo of the Mexicans, *Ephedra*)—two seeds and stems; Evening primrose (*Anagra*)—one woody capsule; Mallow (*Sphaerolcea*)—a few seeds; Brittle-bush (*Encelia*, two sp.)—stems, seeds, and heads common; Hosackia (*Lotus*)—one seed capsule; Spurge (*Croton*)—three seeds; Buckwheat bush (*Eriogonum*)—stems common; Bedstraw (*Galium*)—a few leaves and stems; Spiny bush (*Krameria*)—stems common; Iron tree (*Olneya tesota*)—leaves and stems common; Lichens—a few bits; Grass—no trace that Professor Hitchcock, the grass expert, could detect. More than half of the stomach contents is unidentifiable."[49]

Perhaps the answer to these apparent contradictions is that there was no grass in Texas, Arizona, southern California, and Sonora at the season indicated; and the Sheep ate whatever they could find. Or, it may be the observations in the North were faulty; for those of the desert alone, have the unquestionable testimony of stomach contents analyzed by experts.

In the Bighorn Basin, the metropolis of the Great-horned Sheep, the staples of their food are the delicate upland grasses; and mountain clover when they can get it.

Food in Captivity

It is very fitting that this account of the Bighorn's food be closed with information useful to those who have to feed him.

In 1917, Rudolf Borcherdt, of Denver, was allowed to secure for export some of the half-wild Bighorns that are now the pride of Colorado. After much advertising, he secured three—a tame ram, and, later, two wild ewes—and success seemed in sight.

"But now," he says,"my trials began. The Sheep had been in captivity only a week, and scarcely had touched food of any kind. I began to feed them the best of timothy and clover hay, also carrots and oats. The hay did not seem to suit them, but they would eat sparingly of oats and carrots. When I saw that timothy would not do, I tried alfalfa hay. This they seemed to like better, eating principally the leaves. But . . . dysentery set in, which almost became chronic. The Sheep lost flesh, and altogether looked a sickly pair.

"Finally, I came to the conclusion that hay cut in our mountains might suit them better. I procured a bale of the best South Park hay, and this

[49]Merriam, Ovis sheldoni, p. 132.

alone undoubtedly saved the Sheep. This hay they ate with great relish, and soon laid on flesh and became hearty and strong.

. . . . . .

"When at liberty, the ram used to feed on anything: bread, kitchen refuse, in fact, anything but old tin cans.

"At last Dr. Hyer returned from California, where he had been in the interest of the Halle Institution. We at last got the Sheep ready for shipment. I put each in a separate crate, and sent along a dozen bales of South Park hay, carrots, oats, and cress. In fact, we did not change the diet in the least.

"The Sheep left this country in the best of health and condition."[50]

One of the most experienced animal managers in America is, undoubtedly, W. H. Blackburne, of the Washington Zoo. He has been quite successful in raising Mountain Sheep by adhering to one or two principles: 1st, keep them in a "skinned" paddock; that is, one with all sod and green growth removed; for every bite they eat must be under control. Grass, clover, and weeds, the usual growth of this region, are anathema, absolutely certain to cause fatal enteritis. 2d, give them just so much as they will actually clean up, of mixed timothy hay and whole oats.

Five years' continued success with the same individuals is surely proof that the method is right, especially as a number of these were born and raised in captivity.

Drink

There seems to be no doubt that the normal Bighorn in its normal range drinks deeply of the best water it can find—once every day, preferably in the evening. On the rugged buttes of the Yellowstone in August, it was one of the daily pictures to see the wise old ewe leading her band down, down by devious, dangerous paths with many a cautious, peering, sniffing halt, to the old familiar drinking place.

In winter, they commonly eat snow, so dispense with drinking. D. F. O'Keefe says of the big ram he caught alive in Colorado: "I never knew him to drink water during his 5 months' captivity. He always ate snow instead."[51]

But on the great desert ranges of the far Southwest, where the Sheep still exist in flocks, protected by the climate, the desert sands and the scarcity of water, what do they drink?

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[50]Fifth Ann. Rep. N. Y. Z. Soc. 1901, p. 114.

[51]Recreation, Oct., 1898, p. 270.

The native hunters answer briefly: "The Mountain Sheep of the Desert never touch water at all."

Like the Antelope, the Kangaroo-rat, the Jackrabbit—yes, even the Cattle of those arid regions—they have learned perforce to do without drinking, wherever there is cactus. These vegetable tanks store up greedily every drop of water that they can seize on during the rare showers; and keep it in their big, fat-bellied leaves for their own use, protecting it with the bristling array of fearsome spikes that keep most would-be plunderers away. But the Sheep have learned to nibble off the spines with fine adroitness, until an opening is made to the fat, green water-bag, And so, their thirst is quenched.

Other plants, too, have in less measure a supply of water. Even domestic Sheep learn to use them; and nature adapts their constitution, so that these Sheep often go for months without any other drink than the juices of plants.

There is an ancient legend that a certain man believed eating to be merely a bad habit, so trained his Horse, by degrees, to do with ever less food. Just as he got it down to one straw a day, the unappreciative animal died. The moral of this tale does not apply to the Mountain Sheep; for it seems actually to have trained down so that it does without drinking, and yet lives.

The demonstrator of this amazing idea is the Dwarf Bighorn of El Rosario Mountains, which are on the desert near the head of the Gulf of California, 12 miles distant from the Gila Range "from which it is separated by a flat desert, with 6 or 7 miles of soft, sand dunes. The part of the Mountain large enough for Sheep is 5 miles long and only 1,500 to 1,700 feet in altitude, and is of the honeycomb type like the Gilas. There is not a drop of water in the whole range, and practically no cactus on or near it. The nearest water is 20 miles away in the Gilas."[52]

Here Sheldon found half a dozen of the Dwarf Sheep, and secured a ram, the type of the form *sheldoni*, the smallest Wild Sheep in the world, standing only 30 inches at the shoulder.

In further detail, he says: "During the long periods between rains—commonly 4 or 5 months, and sometimes more than 8 months—the Sheep must live without water; for there are no rocks that will hold water more than 3 or 4 days. No rain fell between August 1915, and the time of my visit in March 1916. The bladder of the ram killed, measured 2 inches, and contained only traces of a discoloured liquid."[53]

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[52]Merriam, Ovis sheldoni, p. 129.

[53]As above, p. 130.

However, the waterless, arid, burnt-up desert is not Paradise for any of the big game. Although plant juices will preserve them alive in times of drought, the mountain spring is the ideal drink. There are many more of these than the passing traveller would suppose; and if there be one within 20 miles, the Sheep will find it out, and by the subtle wireless code of their kind, let all their clansmen know.

His Smell-power Is Small

It is in the line of many precedents that the eyesight of this creature of the open should be of the highest order; also, that his ears should be reduced in size compared with those of the dwellers in the thick woods, such as Moose and Deer. But the power of his scenting sense is surprisingly small, even though what might have been expected.

Ned Frost, the well-known guide of Wyoming, writing to J. A. McGuire of Denver, says in evidence of this: "While hunting near the head-waters of the Shoshone in Wyoming with Judge Ford of New York, Sept., 1915, we had been watching a couple of bunches of Sheep for some time, and one lot of seven being right in line with where we were going, we exposed ourselves to their view, and watched results. Six of them 'beat it' at once, but the other one never moved, and we found later that he was sound asleep in the sun, and he never woke up till we were just opposite him and about a couple of hundred yards away. Then as he got up and saw no Sheep close by, he evidently made up his mind we were Sheep, and here he came, right up to within five feet of us, and then seemed much surprised to find we were not his kind of people at all. But still he was not frightened enough to beat it, but kept walking around us within a few yards as though trying to make us out to be Sheep anyway. He was only a yearling—but show me the yearling Elk, Deer or any other wild animal that would exhibit such boneheadedness! It was just such doings as this that made me think that they were not much on the scent, and I have proven it to myself many times, and even that same day I took Judge Ford right up to within thirty yards of seventeen ewes and lambs with the wind blowing straight from us to them."[54]

To this, McGuire adds after much experience in stalking rams: "I am convinced that they haven't the keen scenting powers with which they are generally credited. I class the Sheep's scenting qualities about on a par with the Bear's poor vision."[55]

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[54]Gamelands, pp. 89–90.

[55]As above, pp. 99–100.

His Leaping and Climbing Powers

There is a wide difference between the mountaineering of the White Goat and that of the Bighorn. The Goat is a climber like the Monkey; the Sheep is a sure-footed bounder like the Chamois.

At once, since bounding is his great gift and the secret of his power, the question arises: How far can he bound? Not more than 6 or 7 feet straight up; not more than 15 feet on the broad jump. These limits I have proved in many ways. Those upward leaps, that look like sheer jumps of 15 or 20 feet, are easily explained, as will be seen; while the broad jumps of more than 3 or 4 times the animal's length, are always on a down slant. A perfectly level broad jump is practically unknown.

A proof that this is so, is seen in the fact that smooth walls, or walls with an overhang—although only 7 feet high—are enough to hold the strongest and wildest Bighorn.

In Amsterdam Zoo, 1900, I saw 3 Bighorns confined in a pen that had walls only 5 feet high, but with $2\frac{1}{2}$ feet inhang, i. e., a total height of about 7 feet.

In Washington Zoo, they keep their 5 superb Mountain Sheep in a roomy paddock, the walls of which are only $7\frac{1}{2}$ feet high, without any overhang. All of which is evidence that a height of $7\frac{1}{2}$ feet is beyond the jumping power of the Bighorn, however strong and active:

How then, are we to account for the amazing feats of high jumping ascribed to the creature by good observers?

In 1886, I saw at the Smithsonian Institution in Washington, a 5-months-old Mountain lamb that had been brought from Montana, destined to be the nucleus of the National Zoo. It was confined in a wire netting corral 8 feet high, and yet again and again it was found to have leaped out. It was quite tame and easily led back; and at length, its puzzling 8-foot leaps were explained. A horizontal 2 x 4 timber, all around at 4 feet from the ground, supplied a satisfactory halfway ledge. In a corner of the pen the lamb would take a flying leap to the flat, narrow, 2-inch timber of the side; in a flash, he turned, got a new take-off at an angle, and reached the top of the fence in what was really the second bound.

In the recent attempt to trap some of the Ouray Sheep, in Colorado they escaped over a corral fence *16 feet high.* So said the magazine article. As a clear jump, this is a physical impossibility. I do not believe there is a 4-footed animal in the world that can leap 16 feet straight up. What really happened, I think, is that the Sheep, in an angle of the corral, sprang against the boards and mesh wire, as high up as they could go; that is, 6 or 7 feet;

then caromed at an angle still higher to the other wall, and maybe, a second carom before they went over and away.

His Weapons and Methods

In discussing these wonderful feats, one should begin by considering the weapons with which they are done. First, the quick, calm brain—the "strong heart," as the Indian would call it; second, the superb outfit of tireless, tense, life-tingled muscles; third, the tremendously strong and supple feet, equipped each with two great soft rubber pads that can grip on any surface, hard or soft, rough or slippery. These feet are further armed with two hard, shell-shaped claws that are backed by a pair of emergency brakes which function or not, according as their owner bends or straightens out his limbs. So we see that soft rubber heels as shock absorbers are not, primarily, a human invention; and hobnails and toe clutches were used by Bighorns for unknown ages, while man was still running barefooted.

Many fragmentary observations, put together, have enabled us to detail the method by which a Bighorn can negotiate an appalling cliff that would be certain death to man, Mule, or Dog.

First, be it remembered, cliffs that are perfectly smooth and plumb, are so rare as to be negligible. No high rock overhangs for any considerable distance; gravity forbids that. And this is law: all cliffs, in some part of their front, lean backward; and are varied with ledges, bumps, and little shelves or crannies. In short, every cliff in the West has somewhere in its front a sheep-ladder.

Provided there be 2-inch footholds not more than 5 or 6 feet apart coming up, or 20 feet apart going down, the Bighorn faces the climb without hesitation. A wide crevice with rugged walls is an easy stairway to this mountaineer. A Monkey might use it successfully; I doubt if a Cougar could; for he has not the right kind of a mind. A man might have the mental training, but he is wholly without the necessary physical powers.

Climbing Up

How perfectly the Bighorn's weapons are adapted to their work is thus illustrated by Muir. He was exploring the South Fork of the San Joaquin River of California in 1873, when as he says, he "chanced to look across the fall, and there stood three Sheep quietly observing me. Never did the sudden appearance of a mountain or fall, or human friend more forcibly seize and rivet my attention. Anxiety to observe accurately held me perfectly still. Eagerly I marked the flowing undulations of their firm, braided muscles, their strong legs, ears, eyes, heads, their graceful rounded necks,

the colour of their hair, and the bold upsweeping curves of their noble horns. When they moved, I watched every gesture; while they, in no wise disconcerted either by my attention or by the tumultuous roar of the water, advanced deliberately alongside the rapids, between the two divisions of the cataract turning now and then to look at me. Presently they came to a steep ice-burnished acclivity, which they ascended by a succession of quick, short, stiff-legged leaps, reaching the top without a struggle.

"This was the most startling feat of mountaineering I had ever witnessed, and, considering only the mechanics of the thing, my astonishment could hardly have been greater had they displayed wings and taken to flight. 'Sure-footed' mules on such ground would have fallen and rolled like loosened boulders. Many a time, where the slopes are far lower, I have been compelled to take off my shoes and stockings, tie them to my belt and creep barefooted, with the utmost caution."[56]

But the spectacular demonstration of his power is in going up a high, rough cliff—ascending the sheep-ladder. This he does by bounding from tiny ledge—maybe but 4 inches square—to tiny ledge a little higher, 3, 4, or 5 feet beyond. Or, if it be in an angle, or a great crevasse, he leaps from side to side, knowing well that he must keep on till he gains the top, or else fall to be smashed below.

Climbing Down

It is notoriously harder to go down a cliff safely than to go up. The process is different; and in the case of the Bighorn calls for different mechanics.

When it is one clear downward leap of a score of feet, the Bighorn can do without steps. His method has been admirably described by Judge D. C. Beaman of Denver, who had enjoyed the unusual privilege of seeing a Bighorn escape from the Dogs, and leap down a precipice of 20 or 25 feet, a drop that would have mangled any other animal of the size. The Judge explains that the ram "made a sideways spring straight out from the edge of the precipice, apparently six or eight feet; and then spread his feet in a sort of bracing way, and with his body in a perfectly horizontal position, and parallel to the face of the cliff, dropped straight down to the foot of the cliff. . . . The position of this Sheep, when dropping, was stiff-legged; but the instant his feet touched the ground, his joints gave way, with increasing resistance, however; his joints acting as springs, until his belly almost touched the ground, before the force of the impact was overcome by the muscular resistance."[57]

[56]Mts. Calif., pp. 312–13.

[57]Outdoor Life, XX, 1907, p. 253.

When, however, the drop is much greater, so that no creature could take it in one jump and live, his method is quite different. John Muir has given us a fine account of it. In this case the cliff was—not 25 feet—but over 150 feet high, and only 8 or 10 degrees off perpendicular. The incident was seen by two woodchoppers who had a fair view of the flock, and could watch their progress from top to bottom of the precipice. To escape from the hunters, the whole band took the plunge, "jumping down in perfect order, one behind another. . . . Both ewes and rams made the frightful descent without evincing any extraordinary concern, hugging the rock closely, and controlling the velocity of their half falling, half leaping movements by striking at short intervals, and holding back with their cushioned, rubber feet upon small ledges and roughened inclines; until near the bottom, when they 'sailed off' into the free air and alighted on their feet, but with their bodies so nearly in a vertical position that they appeared to be diving."[58]

In my story of "Krag," I describe how the great ram descended the deep precipice by bounding from side to side of the canyon, oftentimes landing on a jutting point no larger than his own snout, pausing balanced but an instant, to select the next; and so on, till he safely reached the ground with absolute success. The incident, of course, was fiction, but it was founded on a multitude of accurate observations; so that, in its underlying statement, it was fact.

Thus, I have explained the cliff-mastery of the Bighorn as far as possible. But I have by no means explained it away. The explanation only makes it more marvellous, because true.

Accidents

Now arises the question—do these wonderful mountaineers *never* fail? Are their muscles tireless, their judgment unerring, and their nerves rattle-proof?

Here is testimony: In 1901, H. Clarke Fisk, of Helena, Mont., told me that, some years before, he was watching a female Mountain Sheep with her lamb, that were coming down a high steep cliff to a salt-lick. In his own words:

"They were almost down when the ewe missed her footing, and fell. She rolled over, and then slid and dropped at least 40 feet, before, with a frantic effort, she checked herself. She was then quite near, and, with the

[58]Mts. Calif., pp. 319–20.

glass, I could see her tremble, either with fear or exertion. She stood for a long time, and then timidly worked her way down to the comparatively level stretch at the lick, where the lamb had preceded her.

"When they were finally starting away, for we did not molest them, the lamb tried for a long time to induce the mother to go back on the route they had come," so set off alone. But the old one was either hurt by the fall, or else lost her nerve for the moment. After gazing up the cliff several times, she finally limped off around an easy trail to the summit where she rejoined her lamb.

This was the only occasion when Fisk himself ever saw a Sheep fall. But a man in Helena assured him that he knows a place where there is a gorge across a well-known Sheep trail. It is a very difficult place to leap; and down below, he found the skeletons of seven Sheep that had tried, and failed.

In Arizona University Museum at Tucson, is a Bighorn that evidently had been killed by a fall from a cliff. It was found on Baboquivari Mt., Oct. 31, 1919.

Enos A. Mills writes: "A few times I have known one or more to be carried down to death by a snowslide."[59]

Speed Afoot and Afloat

If Bighorn had the power to make the tremendous leaps attributed to them by some observers, they would rank among the swiftest of quadrupeds. Yet all who have met them in the open, testify that they are easily overtaken by a good Horse. Baillie-Grohman tells of such a case. The rider (himself) was 400 yards behind at the start; the Sheep were 900 yards from the cliffs. Yet he overtook them 40 yards before they reached the cliff, and killed the ram with his revolver.

Had they reached the cliff, they would of course have been safe; for it has been proven by many a hunter, that no Dog, and therefore no Wolf, can catch them in a race over the rocks. Perhaps a Cougar could, but even he would not follow far, for his kind do not hold to the chasing habit.

One does not think of the Bighorn as an aquatic animal, and wonders when he gets the chance to practise. Yet Audubon assures us that in travelling from one range to another, the Mountain Sheep does not hesitate to swim such rivers as may cross his path, and swims well.[60]

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[59]Watched by Wild Animals, 1922, p. 80.

[60]Q. N. A., II, p. 166.

Life on the Uplands

June is bright and often cold on the highlands of the Yellowstone; but it is mild and balmy to the wild things in whom the memory of March is yet strong. High on some broad, level bench they are strung along—the Bighorn ewes, the lambs of last year, and one or two rams too young to be accounted full-grown, dangerous personages,—only in the big-boy stage.

The warm sun in this sheltered nook, the lush, sweet grass, the protection of the cliffs, the absence of insects, make life very pleasant on this high upland. The Sheep laze in the sun, they sprawl, and rub their chins on near-by rocks, they nibble their own legs and flanks, or chew their cud.

The Mothering

The "bell-wether" is a portly ewe, the grandmother of most of them, but a "young woman" still. She is less at ease than the rest of the flock. She rises, looks about, changes her couch, stands head down and pensive. She makes a move to go away, and is at once followed by some of her flock. Then she comes back; she does not want them; she wishes to be alone. Maybe more than once she moves off before she can get away unnoticed. When behind the rocks and out of sight, she goes more quickly. A few hundred yards removed, in some quiet hollow she stops, screened by bushes and rocks, from foes and weather; and stands, legs widespread, head down, and listless. Those who know the way of the wilds could tell that she was suffering. For half an hour she waits; then, yielding to the pressure of the Allmother's hand and the unspoken whisper, she lies down on the soft grass. In half an hour more, are born the little ones—two lambs, long-legged, slabsided little things, but bright-eyed, and coloured like the mother.

So far as is known, the gestation is of the same length as in the common Sheep, that is, 150 days. In the Washington Zoo, young have been born on May 20th, May 21st, May 24th, May 27th, June 26th, July 2d. In a wild state, nearly all come in June.

Now comes the important ceremony called "owning the lamb." As is well known in our barnyards, the lamb that the mother does not own is doomed. In the mountains, the ceremony is equally vital. The owning consists in licking it from head to foot and cleaning it; and incidentally, the mother supplying herself with a purge. The lamb's coat is fluffed and dried, so he is warm and safe, his circulation is promoted; he and his mother get well acquainted for a start. Observations made on a twin of the Mountain Goat showed that the owning of the second one came late, so late that the blow-flies did their deadly work on the tender mucous parts before the

mother care had functioned; and by next sunrise hour, the little stranger was dead—dead for lack of the "owning."

The second of the twin lambs is soon cleaned and dried like the first; the owning is complete. Now her maternal instincts are fully aroused; the fond mother absolutely committed to her task.

Then as she cuddles over them, and rubs her hankering body over their trembling forms, their feeding instinct is aroused, they butt at her twin-peaked udder. Bending, lending herself to them, she cowers low; a few more blind responses to the blind instinct, and the twins are drinking their first drink; the mother's heart is flushed with the joy that is beyond words or understanding.

Maybe she fondles and feeds them for an hour; then, full of food, the lambs lie down under some slight shelter. Sounds from the distance remind the mother that she has social duties and other children.

Glancing apprehensively about, to make sure she is not betraying the crib of her darlings, she saunters quietly but crookedly back to the flock; and life goes on as before. Late that day, she goes again to feed the little ones, and continues to visit them for two or three days.

I find great divergence of opinion as to the length of their hiding time. Some say that the lamb is hidden for 3 or 4 days, and visited by the mother about twice a day. Some say that she never leaves it, and that the lambs can follow the mother slowly within an hour, are vigorous in 24 hours, and when a week old can easily keep by her side at her best pace.

A summary of the evidence and especially that given later in Loring's "Lamb Hunt" (White Sheep Life) seems to prove that usually the lamb can skip about and run quite fast when an hour or two old; but does not follow the mother at all until it is 2 or 3 days old; and does not stick to her closely night and day, until about a fortnight old. At which time, they are ushered into society to become recognized members of the flock.

One by one, the other grown-up ewes slip away during this first part of June—or indeed, any time from the last week of May to the first part of July—and one by one they come back, having borne, most of them, a single lambkin, but some of them twins.

Three groups in the main flock there are, that do not make this silent pilgrimage to the mother shrine—the ewes of last year, now barely twelve months old; the barren ewes and the rams of one, two, and three years, (the prime rams are elsewhere). Always a few of the ewes are barren, either because they found no compatible mate last December, or because they were in ill health, or, maybe, from choice. The barren ewe is known

by her sleek coat, her prime condition, her care-free demeanour. Nevertheless, this barren ewe, the old maid, may not be barren next year. She may find her soul mate; she may change her mind.

The Lambs

Late June sees all the lambkins born and skipping. They are revelling in full supplies of mother's milk, and are also beginning to nibble the soft, sweet grasses of their happy upland.

Many enemies they have at this time—Coyotes, Cougars, eagles, etc. But the cliffs are a sure refuge from the Coyotes, and partly a safeguard against Cougars. Eagles are easily baffled if a few bushes be near; for, once the lamb is in them, the eagle gives up the chase.

There is a special circumstance that helps to save the lambs during their period of weakness. That is the fact that all kinds of game are then abundant. The beast of prey that in winter would follow a week to get a chance at a feeble lamb, would not waste half an hour on it in June, because it is quite easy at that time to fill his belly with other foods strewn lavishly over the whole country.

They have another protection, too, in mother. Sheep though she be, she has sharp horns and a valiant heart when her little one is menaced.

Doctor Mearns tells of a mother Sheep that, in defence of her lamb, faced and fought some cowboys. They had to bombard her with rocks before they could rob her of her baby. They meant to raise it, and it did drink cow's milk greedily; but it was only a few days old when caught, and soon died.[61]

Perhaps the most perilous of the little journeys imposed on the Bighorn is their regular trip for the daily drink; mostly taken in evening, but sometimes at night by the light of the moon.

It seems probable that even when the little one is a month old, it does not follow to a far or dangerous watering place, but holds back, in some safe retreat till mother's return. No one, apparently, has ever seen the old one at a water-hole accompanied by her lamb in the wabbly-legged stage.

Nevertheless, a time comes when, having learned to eat and drink, the lambs do follow mother to the spring. How she dreads the risk of it for her charges! But go she must; and those who have seen her, give a picture of her consummate watchfulness, alertness, and apprehension. She descends a few yards, sniffing, gazing, listening for signs of foe; then advances farther, followed closely by her lambs, till the spring is reached. Their thirst

[61]Mamm. Mex. Bd., 1907, p. 239.

quenched, quickly they return to the nearest friendly rock to graze, to play, and at last to lie down for the night.

A still more hazardous trip that she must face with them, though less often, is in the search for salt.

Once a month all summer, it seems necessary for the grown-ups to seek the health resorts known as "salt-licks." When the Sheep dwelt on the lower levels where alkali was everywhere to be found, they seem not to have been in need of seeking the licks. But now that they have changed their range to higher, sweeter hills, the salt-lick has become a necessity all summer long, at intervals of two or three weeks.

They nurse till two months old, and are then able to live on solid food.

The summer and the autumn go by, without the lambs necessarily seeing their fathers.

Their Cave Life

Now the early snows begin to drive the game down lower, by hiding their food and hampering their movements.

The weather gets colder, and the Sheep begin to adopt a kind of cave life.

The Sheep and the White Goat are the only horned ruminants herein treated, that habitually use caves for shelter. Elk, Antelope, and Buffalo might seek the lee side of a cliff during a blizzard; but the Sheep have well-known selected caves in the rocks, into which they crowd in bad weather. They do not go in very far; that is, not far enough to be in gloom; but only far enough to have shelter from the wind and snow.

Alexander Henry, the rugged old fur-trader who explored the far Northwest over 120 years ago, was one of the earliest travellers to tell of the Bighorn. The first notice of it in his gossipy Journal is on Feb. 4, 1811. He was then on Jacques Creek at the headwaters of the Saskatchewan, and says: "In the face of this mountain, several hundred feet above the river, appears the mouth of a large cave, nearly of an oval form. I observed the tracks of several animals, which seemed to reach the cave down a winding passage among the rocks, but no track appeared to descend below it. These are the Gray Sheep which have been seen about this place; and which delight to dwell among precipices and caverns, where they feed on a peculiar sort of clay."[62] The last remark refers, of course, to the salt-licks.

Henry Bannon describes the experience of his hunting partner during their Cassiar trip as follows: "While going around the face of a mountain

[62] Journal, II, p. 680.

PLATE LXXXIX.—MUSKOX STUDIES

Drawings by E. T. Seton, 1907

PLATE XC.—A BUFFALO HERD IN THE EARLY FALL

(*Bison bison* (Linn.))

on which there were many caves, he came unexpectedly upon a ram at the entrance to one of these caves; and as this lookout sped away, six others rushed out of the cave. Upon examination he found that they had been lying down in the cave about fifteen or twenty feet from the entrance."[63]

Sheep-beds

In milder weather when cave shelter is unnecessary, the Sheep make beds; not in the sense that Squirrels and Chipmunks do, yet they are well known to prepare a resting place by hollowing the ground and scraping away any loose stones that might make the sleeper uncomfortable. This is exactly what Hares do, but neither Hares nor Sheep, so far as I know, do anything in the way of lining their forms with warm or soft material.

L. L. Dyche makes the following observation in point:

"About ten o'clock, a spot was reached where the numerous signs showed that a large band of Sheep had been feeding recently. On the south side of the mountain, the wind and rain of summers and the frosts of winter for centuries, had been breaking off masses of rock, which had accumulated in a sheltered nook. The Sheep had pawed out this soft, crumbling rock, and made beds, which were lined with gravel and smooth stones, and were dry; showing that they had been occupied very recently. There were over 70 of these beds."[64]

Sociability and Voice

Of all our big, hoofed game, the Sheep alone are never solitary. Spring, summer, autumn, and winter they go normally in flocks. When one sees a Sheep all alone, one may rest assured that it is sick or wounded.

Usually the ewe bands number from 20 to 40. The first Sheep that Audubon met were at the mouth of the Yellowstone, June 12, 1843, when he saw a flock of 22, composed of ewes and young rams.[65] 40 or 50 may be considered a large band. Yet Elliot saw 150 together in British Columbia as late as 1886; and A. A. Anderson tells me that in the Bighorn Basin, he saw as many as 200 in one ewe band during the '80's.

The great flocks of ewes and lambs move down to lower levels; but so do the smaller bands of the great "curling-horned" rams. They appear now, but they do not join the ewe bands, nor do they enter into the flock life.

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[63]Forest & Stream, April, 1918, p. 206.

[64]Camp Fires of a Naturalist, by Clarence E. Edwords, 1893, pp. 155–56.

[65]Q. N. A., II, p. 165.

These ram bands or "buck bands," are rarely more than 5 or 6 in number. The highest I ever heard of among the prime "curling horns" was 15.

The rule of vocal gift in equal ratio with sociable instinct hardly holds with this species. The Bighorn is one of the most silent of animals. The lambs up to 6 months old, often bleat exactly as do the domestic kind; but I never heard any sound from the old Sheep except a loud snort or "snoof."

I suppose the answer is that this creature is gregarious rather than sociable.

Social Cleavage and September

There are, then, these two well-marked social groups in the Sheep world—the great flock that is the main body, consisting of ewes, lambs, and young rams, led always by the wise old ewe who is grandmother to many of them; and the second group, composed of half a dozen huge rams, 7 or 8 years old, in their full-grown prime, with great curling horns that would be a crushing load to a weaker beast.

There is a natural aloofness, an instinctive etiquette, that has hitherto kept these groups apart. But this feeling now weakens, as they see each other daily on the range. Often, in late September, they have become so tolerant of each other that they drift about together, still led, however, by the wise old ewe.

Prof. Leon L. Gardner, of Pomona College, has given us a picture of Sheep life at this stage among the mountains of southern California.

In Sept., 1914, while hunting for Deer in the mountains north of Los Angeles, he was "at last led to the outermost point on Ontario Peak, and here a rest was taken on the top of a big rock. About midafternoon the silence was broken by faint yet unmistakable sounds, which could have only been made by a whole troop of animals. There was the sound of twigs snapping, the bleating of lambs and the peculiar shuffling sound caused by the tramp of many feet. It was very evident that a band of Sheep was approaching. A cautious observation over the edge of the rock disclosed a very interesting sight. Coming along the top of the ridge was a party of Sheep, an individual stopping here and there to nibble at the vegetation. The rams, with their great curling horns, were a majestic sight, while the young of the year were exceedingly playful and altogether charming. Unfortunately, at this stage a scent warned the Sheep. In a second the whole band halted, heads up, noses questioning, then at an invisible signal they all wheeled and made off in jerky, stiff-legged, bouncing leaps, and quickly disappeared from view."[66]

[66]Cal. F. & G., Jan., 1918, p. 19.

September is the moon of good times, good food, and happiness. Then the Sheep appear the best; and rejoiceful it is to see their bodies respond. Clarke Fisk writes me:

"I think they are next to Goats in their ability to take on tallow, and I have seen some old rams who looked almost square from a side view, almost exactly resembling the stock lithographs of fine bred domestic rams, with the single exception that their horns were much more pronounced. At this time, the old rams will have from two to three inches of fat on their hindquarters and up their backs while the kidneys will be a great mass of fine, white tallow."

The Crafty Old Ram

Many experienced hunters have told us of the old ram's cleverness at hiding; especially when cornered in some place from which he could not escape except by exposure to fire. He commonly crouches like a Rabbit, and refuses to spring until absolutely certain that he is detected.

Baillie-Grohman has many pages extolling the marvellous gift for self-preservation that distinguishes the experienced old Mountain rams.

They are, he says, "very cunning animals; they will let the sportsman pass them a few paces off and not budge, and, when he has turned his back, rise and make off. Of this I very frequently convinced myself, till I finally got into the habit of filling my right pocket with pebbles, and throwing one or two wherever they could possibly be hidden under overhanging rocks or other shelter; my trouble being rewarded on several occasions by thus starting small bands of eight or ten heads, giving me capital opportunity to select the best."[67]

Describing the pursuit of two wounded rams, he says: "On both occasions, we spent a whole day vainly trying to get our victim, who carried good horns. Leading us circuits up and down endless and very steep slopes, they got away on both occasions by returning like the Hare to the spot where they put up; and from thence keeping to their old spoor, they finally left it where the ground was most broken and no snow, by one huge leap, down steep rocks, where their spoor was soon lost."[68]

Clarke Fisk, who witnessed this ruse many times, has sent me a long and detailed account of a memorable occasion. He and his friend, Joe G. Hilger, while hunting on the Upper Missouri, saw a ram on a far, high ledge. Both fired and missed. The ram scrambled around a point and out of sight. After several hours' hard trailing and climbing, he made sure that the ram

[67]Camps, p. 166.

[68]As above, p. 167.

had not gone far, but was somewhere near and in hiding. Now, his companion rejoined him, and, in Fisk's own words:

"After he had missed me he had climbed around the rocks for several hours till at last he found himself down on the point around which the ram had gone when he left the basin. Off to the left was a dark cavern which ended in a black cave. He could not see into this from where he stood nor from above, as a point of jutting rock partly hid the cavern's mouth. Down off the point, some fifteen feet, a narrow shelf cut round into the gorge. On this there was still a little snow, and Joe climbed to look for tracks. He was forced to leave his gun on top, for, in 'shinning' down a dead tree which he used for the descent, he was obliged to use both hands. There on the shelf were the ram's tracks, so he thought he would work around and look into the cave. The shelf was narrow and Joe had to cling to the rocks above with both hands to keep from falling. In this way he was busy for some time when a frightened snort stopped his progress. From where he was he could look into the cave and there, 'big as life and twice as natural,' was the ram. The old fellow was very much startled at this storming of his retreat, and stamped and snorted as he gazed wild-eyed at his pursuer.

"Joe said he wished he was safely out of that scrape, for the only exit from the cave was the narrow pass which he now almost filled. The ram could not have passed upon the shelf without one at least going off the ledge, and as it was about a hundred feet to the first landing Joe did not want to be the one to go. The actions of the ram indicated that he was going to clear the way with his mighty head.

"But the quarters were too close for the Sheep, and with a final snort he started out. Joe hung tight and clenched his teeth and waited for the end. But with a mighty bound the ram went sailing like a bird over his head, then dropped and dropped, but finally landed far below on the narrow ledge. When he struck, the ram's shoulder blades came out high above his withers, and his belly scraped the shale as the broad back sagged with the weight and speed, for the distance was almost one hundred feet. Though the ram may have known of this ledge below the cave, when he started on his leap he could not possibly have seen where he was going to land. With the impetus of this tremendous leap, the Sheep had stopped himself in a couple of stiff-legged jumps and had then made off around the cliff on his back track."

The Battering Rams

December on the Northern ranges means deep snow, hard frost, and the mating season of the Sheep—matings, as in most animals, and especially

among the highly polygamous, that are ushered in with deadly combats. Lions roar, Elk bugle, Cattle paw the earth, Deer slash the brush by way of challenge, then close and do their best to win. The Mountain ram wastes little time in idle mockery, squanders no breath in bawling.

Sometimes he scratches the gravel as a gesture of defiance, and I think that sometimes he stamps.

But even in the height of the love-and-war season, the ram seems to dispense with the unnecessary embellishment of loud talk. He looks at his enemy, shakes his head, maybe rears for a moment. The other knows exactly what that means, and gets ready. They back off a little for a good start, and from a hundred feet apart, they let loose. With a muzzle velocity of 20 miles an hour, they meet like two pile-drivers. The crack of horn against horn can be heard two miles off on a calm day; each a 300-lb. projectile hurled with that fearful force. How can skulls and neckbones stand it? Yet they do; and the mighty brutes wheel off, ramping on their hind legs, like heraldic unicorns. Each strives to show the other fellow how fresh and unwinded he is. Then they back up, and go at it again—BANG!

Sometimes, though rarely, the horn may exercise another function,—not of sledge hammer, but of sword. Baillie-Grohman records the taking of a ram "shortly after the rutting season, who had an immense cut, extending from the shoulder to the middle of his back; a wound undoubtedly inflicted by a rival."[69]

But this is rarely the finish. Weight and endurance are what count. They wheel and charge again and again, maybe half a dozen times before they prove the present problem, and show clearly, to the satisfaction of both, that 312 lbs. multiplied by 20 miles an hour and backed by 10 recuperative kilowatts is better than 340 lbs. multiplied by 20 miles an hour and backed by but 5 recuperatives. This is nature's try-out. For this they have trained; and for this, and by this, their race was made; for this they grew these mighty horns.

My old friend, Col. G. O. Shields (Coquina) was privileged to witness one of these thundering fights in the palmy days of the '80's. Thus he sets it forth in his "Big Game Book":

"Two lusty old rams became involved in a quarrel over a demure-looking ewe, whom both seemed anxious to captivate. As one of them moved toward her, the other, which was a few feet in the rear, made a vicious rush at him, and striking him on the port quarter, sent him spinning and reeling a distance of twenty feet or more. This was the signal for open

[69]Camps in Rockies, p. 420.

hostilities. The jealous rivals squared away, faced each other, and prepared for war. For a moment they stood sullenly eying each other, their manes erect and their eyes flashing fire. Then, as if at a given signal, they lowered their heads and charged each other with all the force and fury of mailed knights in the lists. Their massive horns came together with a shock that seemed sufficient to grind them to splinters, and to dislocate the necks of the angry beasts; but they simply reeled, staggered, shook their heads, and then slowly backed off, until thirty or forty feet apart, for another encounter. Both now seemed more savage and desperate than before. They snorted, groaned, and pawed the ground in their rage. By this time most of the herd had gathered about to watch the battle. They formed almost a perfect ring around the contestants, and seemed as deeply interested in the fight as are the toughs who gather to watch a human slugging-match.

"Again the burly foes went at each other with the speed of race horses, and met with the same terrific shock as before. The sound of their clashing horns could have been heard a mile. The animals were evenly matched in size, and the contest was bitterly waged. Each round consisted of a single assault, and as the belligerents became heated and blown, the waits between the acts were prolonged, each requiring time to recuperate for the next onset. Both were now bleeding profusely at nose and ears, and apparently suffering great pain. Yet the terrible blows were given and received with as great spirit and as unwavering courage as at first. Finally, after a dozen or more rounds had been fought, both rams began to stagger and totter on their feet. Still, there was no indication as to which would be the victor.

"At this stage of the game, a restless partisan of one of the contestants made a rush at the other, and striking him squarely on the shoulder, knocked him down. No sooner had he dealt the blow, than he in turn received a countercharge, from a champion of his victim, that sent him to grass. These two then squared for each other, and the fight at once became four-cornered. Shock after shock resounded over the hills, and the sound of the blows was like that made by powerful men breaking rocks with great sledge-hammers.

"Finally, the original pair drew off, neither having strength nor inclination to pursue the other; each staggering and reeling as if each step must be his last. The fresh combatants hammered away at each other until they in turn began to falter. But these were not so well paired as the others, the one that first entered the lists for his friend not being the equal of his antagonist in strength or staying qualities. At every onset he was driven back, and more than once was forced to his knees by the superior

weight and strength of his adversary. At last he was thrown backward with such force that he fell prostrate on his side. His antagonist followed up the advantage thus gained, and when the unfortunate creature attempted to rise, struck him a fearful blow that laid him out, to all appearances stone-dead. The victor then walked away with his head up, and thus the battle was ended. The vanquished ram soon recovered, partially, and slowly regaining his feet, staggered away and left the herd."[70]

Now here is an interesting sidelight offered by Sheldon. His observations convince him that two rams that have chummed together all summer, in true ram fashion, will not fight each other in the fall. Even under the mating craze, their old friendship stands the strain. They divide whatever mates there are to divide. All their warlike fury is reserved for, and turned against, some stranger ram that attempts in modern parlance to "butt in."

Their Gallantry

In these great battles-royal, broad chips and splinters fly from the horns of the battering rams. One wonders indeed that any part is left intact. And when the great Ananias-Munchausen sought to explain those breaks by stating that the huge ram lands safely on his horns when he leaps from a mountain-top to its base, the matchless nature-fakir forgot the law of gallantry. See how unfair he was to the lady Sheep who have no such headgear to act as shock-absorbers.

But no one can accuse the "Bélier de Montagne" of being ungallant at this season. He fights to win; and having won, the victor takes the spoils. All of them. Nor are they coy about being taken. For every ounce of strength and unit of desire that is in their strong and amorous make-up is now consecrated to conforming with the scriptural admonition to be fruitful and replenish the earth. The Long-night Moon, December, is the time of the fecund passion. A score of wives this grand old Turk may have had; and a score or more young Bighorns of his ten-times sifted and selected breed, may be born in June, to carry in them the best endowments of the race, so far as he embodied them.

By January, the Snow Moon, the craze is over in the North; and the mighty and much-married ram goes calmly back to the club; that is, to his coterie of bachelor friends. He wonders, doubtless, as he passes by the ewes, whatever he could have found attractive about those dull creatures not so long ago.

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[70]Big Game of North America, 1890, pp. 382–83.

Never Surrender

An interesting picture of the Ram's combativeness at other times than the rut, is furnished by D. F. O'Keefe of Leadville, Colo. He was snowshoeing to view some mining claims in the mountains, just after a heavy snowstorm in Feb., 1897. He noticed a dark spot in an enormous snowdrift, some distance ahead. Watching intently, he says, "I made out a Mountain Sheep, helplessly floundering in the deep snow. As I drew near, I could see he was completely worn out by his struggles. He looked up with such piteous, appealing expression, that I had not the heart to leave him there. But when I went closer, he showed fight, and would have none of me. At last I got him by the horns, dragged him to a sheltered spot, and there left him for a while. Then I went back to get my Horse, but he had gone home, so I walked 8 miles to a cabin, got a man and 2 Horses, returned as far as we could on horseback, and snowshoed to where I left the Sheep. By dint of 4 hours' dragging and pulling, we got the old fellow to the Horses. Then it was an easy matter to pack him to the cabin.

"I stayed in the cabin that night, and next morning went on to my claims. On my return, 3 days later, I stopped at the cabin to see the Sheep. He looked very different from the poor wreck I left there. I was told that he had been eating everything in sight, from salt and oats to sugar, and had grown very 'sassy.' We made a box, put him in, took him to the railroad station, and shipped him to Leadville by train."

Once there, they tied him, by a rope, to a tree, thinking he would be a fine pet. But he would make no peace, nor permit anyone near him. As the rope soon showed signs of wear, O'Keefe feared the ram would escape, so decided to move him to the barn. Although the animal weighed only 150 pounds, it took 4 strong men to handle him. However, all closed in at once, and managed to hold him to the ground. In one corner of the barn was a high bank of snow and ice. On this he would stand in fighting defiance of all. He never surrendered, so finally he was sold, and shipped to Hamburg, Germany.[71]

The Timidity of the Ewes

In sharp contrast with the fortitude of the rams, is the fearsome shyness of the ewes. They have been known actually to die of fright. The following case in point is supplied by Clarke Fisk. He and his hunting pal had scattered a band of Sheep. He says:

[71]Recreation, Oct., 1898, p. 270.

"One of the Sheep ran into a narrow canyon. They knew that she could not get out, so while one held the entrance the other went back to the Horses after ropes. As they approached, the ewe stood trembling in the farthest recess of the rocky trap. One of the men at the first cast caught her around the neck. She made no effort to escape nor offered any resistance, only as they drew closer she shrank still farther back against the rock. As one was about to lay his hand on her she fell over and in a few minutes was dead. Inasmuch as she had not struggled, the theory that a bloodvessel had been ruptured could not be advanced. The only supposition they could vouchsafe was that she had simply died of fright."[72]

Winter Life

If you have the luck to be in Yellowstone Park during January, you will see a wonderful reproduction of primitive wild life among the Sheep. Half a dozen of the great "Curl-horns" are always on the uplands just below the crags of Mt. Everts; and down among the sheltering flats and canyons of the Gardiner River can be seen a flock of 40 or 50 ewes, lambs, and ramlings. The big fellows are shy and avoid being photographed. But the flock by the river scarcely turn their heads to look at you.

This was the ancient social placement. The great difference to-day is that continual pursuit has made this once unwary creature the wildest of the wild. The old rams with 7 or 8 years' rings on their 18-inch calibre horns are the shyest, wariest game in the West.

This, indeed, one may accept as a rule: That in a flock of Bighorn, there is always one on the look-out, one keen-eyed sentinel perpetually on duty. And of this be sure—he can see you twice as quickly, and three times as far, as you can see him. Finally, he can travel 10 miles while you travel one—and rarely fails to do so.

Curiosity and Strange Instances

There is just one weakness in the mental panoply of the Bighorn; that is his curiosity. It is not the overpowering, alluring kind, that possessed the Antelope, and permitted thousands to be decoyed to their doom; and yet it is just enough to prevent his making good his escape when startled by some near and suspicious sound. His first impulse,—and he commonly acts on it,—is to bound away a few yards, and up on to some lookout, where he stands at gaze until he makes out the nature of the menace; or often, alas, until the crack of the rifle says "too late."

[72]Mss.

George F. Dippie, taxidermist of Calgary, told me in 1914 that he got a very large ram's head that had a rock tight wedged in between its horn and its cheek—doubtless a souvenir of some landslide. This head was sold to Doctor Palmer of Davenport, Iowa.

A. Phimister Proctor, the animal sculptor, has a notable ram head, one in the record class. He killed it on Yarra Creek, north of Waterton Lake, Alberta, Sept. 14, 1910. It has 2 or 3 Porcupine quills between the horns. What a suggestive embellishment! One can imagine the meeting of those two redoubtables, probably on some narrow ledge, above a canyon, and their mutual disgust at the outcome; especially if the ram knocked the Quiller off the ledge, and got his head swelled with quills for his pains.

A curious case of innocent curiosity is thus recorded by J. A. McGuire of Denver. It was told him by Ned Frost, the well-known Wyoming guide.

"I once had a good-sized ram come up to me where I was eating my lunch," he says, "and after working around, and sizing me up from all sides, he finally came right up to me and actually licked my hand, and I could see myself in his eye, just like looking in a small mirror; but when I made a grab at his front legs, thinking that perhaps I might be able to throw him and get him in alive, he got really frightened and showed that he was a real sure-enough wild Sheep, by getting down off that mountain and up the other side of the canyon and over the highest peak in sight without hardly stopping to look back. I would not have liked to tackle the job of getting within rifle range of him again that day."[73]

Antler-bound bucks have been found in every species of North American Deer, but I was not prepared to hear of horn-bound rams. W. H. Blackburne, of the Washington Zoo, tells me that the two big rams in the Bighorn herd there, got their huge horns interlocked somehow by accident as they fed, and spent half a day wandering about tightly hooked head to head, arm in arm, until at length, by some lucky twist, they solved the problem and parted. These two never were known to fight.

Many animals make odd partnerships, the basis of which seems to be partly common interest, and partly good fellowship. W. A. Wadsworth says: "I have seen a yearling Bighorn ram walking solemnly along a mountain trail after a big bull Elk."[74]

Similar cases are given in the White Sheep Life.

One of their strangest habits, says Baillie-Grohman, "is the friendly relationship existing between them and the mountain magpie—about the

[73]Gamelands, p. 89.

[74]N. Y. S., F. F. G. Rep. for 1901, pub. 1902, p. 242.

only bird you see or hear on the timberless barren mountains, which are the favourite home of the Bighorn. Small flocks of ten or fifteen birds will settle down on the backs of the grazing Bighorns, and begin to pick away very busily at the minute larvae that infest the scrubby coat; two birds often being engaged on the same animal."[75]

Playfulness

It is recognized nowadays that animals get practically all their training for the life battle, in the form of play, more or less, organized as games. Witness the training of kittens over imaginary Mice, and of puppies over things they pretend are Deer.

The only reason that men have ignored the games of wild animals was that they were too busy killing them to observe them. But good hunter-naturalists are growing up, and opportunity is coming back in a small degree at least.

Wm. R. McFadden, of Denver, and other observers, describe young Bighorns playing "King of the Castle" like the lambkins of our common Sheep. Once at Crater Lake, British Columbia, he had the good luck to see a flock of 57 ewes and lambs. There were 23 of the latter; they were playing like domestic lambs, butting each other in mock fight, merrily gambolling and jumping on a little hillock that evidently was the castle.

Doctor Merriam tells me that he has watched them leaping on their mother's back as they played the game, and she stood stock still as may be —happy indeed to be the dummy in their game.

Enemies

Ordinarily man, the deadliest enemy of the Bighorn, can do him little harm on the desert ranges where rugged mountain, arid plain, and the fear of thirst unite to protect the wild things. But another factor enters the problem. Springs are located by the diligent search of man as well as beast. Near one of these the destroyer, with his deadly weapons, can lie in wait with every prospect of success.

Nelson says, "Mountain Sheep are peculiarly endangered by this slaughter owing to their habit of going in bands and drinking at certain watering places, where hunters lie in wait behind blinds built of loose stones, and kill individuals of all ages and both sexes, often in a few minutes destroying an entire band. I have been informed of one party having killed more than 100 Sheep in this manner to make dried meat during a single season."[76]

[75]Camps, p. 163.

[76]Lower Calif., 1921, p. 132.

Among the wild things, the worst enemy the Bighorn has is the Cougar or Mountain Lion. He is known to take his toll of the herds especially in winter.

In Yellowstone Park, in Jan., 1914, I saw and photographed a 2-year-old ram that was crippled as a result of meeting a Cougar. This was the only solitary Sheep I met. But Cougars are not plentiful, and they love not the open, rocky hillsides to which the Sheep resort.

A. A. Anderson, of New York, tells me that he once wounded a Sheep, but followed and got him; then took part of the meat to camp. When he came the next morning for the rest, he found that a Mountain Lion had followed the trail, and eaten it all.

Wolves undoubtedly rank high among Sheep killers.

Dr. George W. Field of the Biological Survey, gives me some evidence. In the March of 1917 he was going along the Gardiner side of Mt. Everts in Yellowstone Park, when he saw two big rams lying down together on the mountain-side above him. Suddenly, they arose, and intently watched something to the eastward. Then Doctor Field saw a big Timber-wolf stalking the rams. It advanced not directly, but in a succession of zigzags. The rams, however, were alert and bounded away before the danger became serious. Under some circumstances, this approach would have meant success for the Wolf.

In Alaska, both Lynx and Wolf are charged with much destruction among the Bighorn. These are treated in the Life of the White Sheep.

What may, perhaps, be listed as an enemy, is the vegetable Porcupine, thus mentioned by Bailey in describing the Sheep he collected in Texas:

"The legs of the Sheep secured were filled, especially below the knee, with cactus and agave thorns that had gone through the skin, and broken off in spikes half an inch to an inch long, and lodged against the bone or the inner surface of the skin. A large share of these thorns were the terminal spikes from the leaf blades of *Agave lecheguilla*, which grows in great abundance over the hot slopes of the mountains, and which the Horses avoid with even greater care than they do the numerous species of cactus."[77]

Diseases and Age

There seems to be only one dread disease among the Bighorns; that is, a species of scab or mange.

Edwin Carter, of Breckenridge, Colo., told me in 1899 that the Sheep in Colorado were very subject to a skin disease like mange. Some were so

[77]Texas, pp. 73–74.

badly affected that the ears were plugged up swith a mass of solid matter so hard that it could be removed only with a strong, sharp-pointed tool of metal. When he came to Colorado in 1859, he found it as prevalent as now.

Warren records that "C. F. Frey tells me they suffer much from scab in the West Elk Mountains," and that a party told him in 1902, at one place near the head of Sapinero Creek, 75 head were counted which had died of scab. Domestic Sheep have been run in that locality, and the Wild Sheep doubtless contracted it from them."[78]

Dr. William S. Devoe of Pine Ridge, S. D., tells me that he examined these Sheep, and found the disease to be true *scabies*. The sheepmen say that the Bighorn gave it to the common Sheep; the cattlemen claim it was the other way.

A. A. Anderson considers that scab became virulent only when the Bighorn were driven off their ancient alkaline feeding grounds up into the different surroundings of the high pastures. Alkali, he considers essential to their health, and up in the mountains where they cannot get it, the unnatural food gives them liver disease; they get thin, go scabby, get blind, and die

Whatever the cause, the disease is well known, and sweeps through the ranks of the Sheep like fire through prairie grass.

Abe Leeds tells me that when he and Pierce Cunningham trapped in the Bighorn country in 1886, the Sheep were more plentiful than any other game. They were then in thousands, and commonly the hunters saw 500 Sheep in one day. But between 1886 and 1890, the scab was brought in by tame Sheep, and the Bighorn died like flies.

In *Recreation* for July, 1898, p. 57, is an article by Vic Smith, of Anaconda, Mont., stating that in 1885 there were large bands of Sheep in the Wind River Mountains; but next year, domestic Sheep brought in the scab, and cleared them out. In 1886 "near where Red Lodge now stands I counted . . . 43 dead Mountain Sheep on one hillside, all having died with scab."

In most of the Sheep country, the plague burned itself out; but since then, there has been more than one local outbreak. In 1914, it appeared among the Sheep of the Lemhi Natural Forest; and more than once, it has been reported in the Yellowstone National Park.

A curious possibility is found in this quotation from Baillie-Grohman: "Professional cimarron-hunters generally carry a meat-bag, as contact with the hairy coat of the Deer-sheep often afflicts the human skin with

[78]Mamm. Colo., 1906, p. 238.

cosquillas ('sheep-tickle') a persistent itch, that sometimes spreads from the hands to the chest, but strange to say, cannot be traced to any visible cause. Like mange and prurigo, it is probably caused by microscopic parasites."[79]

I have enquired many times and in vain, among hunters for further information on the "Sheep tickle." No one else that I can find has mentioned it.

The ram is usually prime at the age of 5; and continues so for at least 4 or 5 years. In the Washington Zoo, 1926, there died the old ram who had dominated that small band for 8 or 10 years. He was 20 years of age, and evidently very old.

Snow

One cannot close the list of natural foes without large mention being given to snow. Cold weather is a small matter to the Sheep, if they can get food; and food there is in abundance on their range, so long as it is not hidden under deep snow. A little snow is amusing; for the grass and mountain clover are green beneath it. The Bighorn paw like Horses on the range, and win an ample feeding.

If a heavy storm come on, they huddle under some sheltering cliff where, crowded side by side, they keep each other warm; and work their way out after the storm is over. Or maybe they have a well-known cave into which they crowd and take life easy, out of the blizzard's reach. Then, in the calmer time, forth they go to set merrily about digging up another meal —only going a little deeper than a few days ago.

Still they thrive, but when the snow gets so deep, and so ice-encrusted that they cannot reach the daily ration, the old ewe faces the stress, takes the one way out—leads the flock forth, and down, down to lower pastures where maybe there is less snow. Oftentimes it is so; for there may be two months' snow on the upland and only one in the valley. But far now from the safety haven of the cliffs, they are exposed to greater dangers from enemies that would feed upon their flesh.

Sometimes they linger so long in the uplands that the fathom-deep snow itself prevents their travelling out.

"How the Wild Things Die" is the title of an article by W. B. S., in which he sheds light on the hardships of deep winter in the High Rockies. It was on the Continental Divide near Mt. Richtofen in Northern Colorado, where "the snowfall is often so heavy that the cabin itself completely dis-

[79]Camps, p. 421.

appears; and it would seem as if no living thing larger than a Squirrel or Marten could survive. But such is not the case. This section is rather noteworthy for the number of its Mountain Sheep. They brave out the winters in spite of the snow, subsisting upon the scanty herbage, found in sheltered nooks among the rocks or on ridges swept bare by the wind.

"One recent winter, when the snowfall had been reather heavy, two of the company's men, stationed at the cabin, heard a furious barking from their Dog. He had found in the snow and brought to bay near the cabin a fine old ram. The poor creature was nearly dead from lack of food. The storms had evidently covered up his range, and being old and feeble, he had been unable to follow the more vigorous members of his flock to pastures new. The old monarch was rescued from the Dog, tied up and offered hay in plenty. But his teeth were nearly gone and the diet was unaccustomed, so he could do little with it, succumbing after a few days from sheer inanition. As that region has many Mountain Lions, it is quite remarkable that death came to him from the disabilities of old age and not by violence."[80]

"In travelling in the heavy snows," says Clarke Fisk, "Sheep string out in single file, the leader setting the pace, which under existing conditions is surprisingly fast. He will jump up and forward out of the snow, and land perhaps fifteen feet ahead. On and on he jumps till he is tired and then another takes his place. And all follow directly in his track. The speed so maintained, even if the snow is well above their backs, and the distance which can be covered in a comparatively short space of time are remarkable. I have known of their travelling almost fifteen miles over two high ranges in a little more than three hours when the snow lay not quite four feet deep."[81]

The snow-slide—that terror of the mountains, that visible incarnation of the Snow Devil, doubtless claims far more Sheep lives than we dream of.

When I visited John Muir in 1899, he gave me in conversation many interesting details of Sheep habits. He says these animals usually descend from the high mountains when driven by the snow; but sometimes they get caught by a sudden heavy storm. About 1875, on the South Fork of the San Joaquin River, about 11,000 feet up, he found 5 large rams all dead together in a space as large as a room. There was nothing but the hair and bones, with a huge pile of chrysalis cases at each. Evidently they had been caught in the snow and had died together.

"Forest Ranger E. E. Chapson of Pagosa Springs [Colo.], says that a good many Sheep are killed by snow slides in the San Juan Mountains north of that point. In one instance he discovered the carcasses of 3 or 4 Sheep

[80]Forest & Stream, June 17, 1911, p. 935.

[81]Mss.

which apparently had been so closely shut in by a snow slide as to be at the mercy of a band of Coyotes. The snow crust was sufficiently strong to the light-footed Coyotes, but too weak to support the heavy-bodied Sheep, and unmistakable signs in the snow showed that the Sheep had been killed and partly eaten."[82]

A snow disaster immensely greater is outlined in information recently received from my friend, G. J. Guthrie Nicholson, of Newport, R. I. He tells me that in 1916, not far from his ranch at Four-Bears, Wyo., he found a deep, westward-facing gulch, above Horse Creek, Wind River Mountains, in which were the skeletons of hundreds of Mountain Sheep—males, females, and young—all evidently overwhelmed together, perhaps 35 years ago. Probably they were the victims of disease and snow. Yet they did not date back to the great plague of the '80's that swept the Bighorn herds from the hills.

Stories of the Chase

There are four, at least, that I find pleasure in reading, and counsel the reader who is interested to get them. They are too long for inclusion here, but those who wish may find them. They are:

"Description of the My-attick or Mountain Ram," by Duncan McGillivray, who, in the fall of 1800, met a band of Sheep on the site of Banff, Alta., and secured a ram which was the first specimen known to the world of science. (See section on History.)

"The Hunting of the Record Ram," in 1880, by Howard Eaton, which tells how Howard, then a boy in the twenties, secured a world's record in his first shot at a Bighorn.[83]

"An Experience in Ram Land," by L. Bush Livermore, which I like because it gives the dizzy horror of the mountain-sides; also the calm, certain mountaineering of the ram—and without a red spot on the page.[84]

Finally, "How the Big Ram Was Killed," by F. W. S. This appeared in *Recreation* for July, 1897 (pp. 10, 11, 12). It is Scotty McDougall's own account of how he killed the great Gunder Ram after a winter-long hunt. This Ram was the prototype of Krag in my story, "The Kootenai Ram."

From a great mass of bloody hunting stories—I don't know what possessed me to save them—I have selected these. They have fewer gloats, less blood, and more worth than the rest.

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[82]M. Cary, N. A. F., 33, 1911, p. 64.
[83]In the Open, Pittsburgh, Pa., Vol. III, No. 1, Aug., 1912, pp. 5, 6, 7.
[84]Outdoor Life, March, 1922, pp. 182–3.

Their value may be that of ancient record or of definite information. In some, there is even a redeeming golden thread of human heroism; but each and all of them is more or less an unwitting attest to the nobility of the hunted wild thing, that never surrenders, never gives up; and after he has done his glorious best and failed, dies in his homeland—silent, steadfast, without wail or moan, or the hint of a craven thought.

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LIFE LVII—THE WHITE SHEEP

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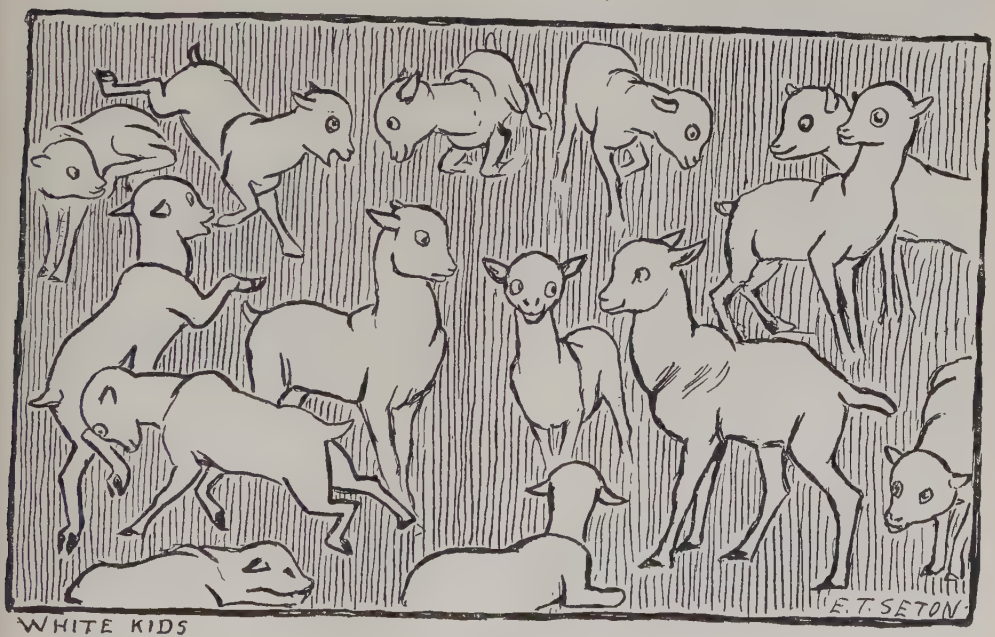

WHITE KIDS

White Sheep, Alaskan Sheep, Dall's Sheep, Thin-Horned Sheep, Slender-Horned Sheep, Slim-Horned Sheep, Wide-Horned Sheep, Snow Sheep, Arctic Sheep, Saddle-Back, with Its Southern Races, Black Sheep, Liard Sheep, etc.

Ovis dalli (Nelson)

(L. *Ovis*, a Sheep; *dalli*, in honour of the Alaskan explorer, Wm. Dall)

Ovis montana dalli Nelson, 1884, Proc. U. S. Nat. Mus., June 3, p. 13.
Ovis dalli Allen, 1897, Bull. Amer. Nat. Hist., Vol. 9, Apr. 8, p. 112.

Type Locality—Mountains west of Fort Reliance, Alaska.

A true Sheep in its form and habits, the White Sheep is easily distinguished afar by its pure white colour, and its long, slender horns. This is a silver ram with golden horns and jewel eyes. It is much smaller than the Rocky Mountain Bighorn, as will be seen by the following measurements from Dr. J. A. Allen's paper.[1]

Size. Adult ♂: Total length, 4 ft. 10½ in. (1,484 mm.); hind foot, 16½ in. (419 mm.); tail, 4 in. (102 mm.).

Adult ♀: Total length, 54 in. (1,369 mm.); hind foot, 15 in. (381 mm.); tail, 3½ in. (89 mm.).

Weight. Rams, about 200 lbs.; ewes, about 150 lbs.

Colour. Everywhere of a dingy white, slightly shaded in summer with dull, rusty tipping to the hair, especially about the back. The horns are of a warm, yellowish horn or amber colour, and the hoofs dark horn colour. The eyes are a dull gold colour.

The lambs at birth are snowy white, while those of *canadensis* are brownish gray. This is significant. It points to complete differentiation between the two species.

Races

The following races have been recognized:

dalli Nelson, the typical form. It is pure white. T. l., Near Fort Reliance, Alaska.

[1]Bull. Am. Mus. Nat. Hist., March 4, 1899, p. 3.

kenaiensis Allen, much like *dalli*, with unimportant skull peculiarities. T. l., Kenai Peninsula, Alaska.

stonei Allen, in general form and size like *dalli*, but nearly black on the body; that is, it shows the same pattern exactly as *canadensis*, but has the white areas extended, and the gray-brown replaced by a blackish brown. T. l., Headwaters of Stikine River, B. C.

fannini Hornaday, intermediate between *dalli* and *stonei*, as it is white with a gray blanket on its body, gray facings to the legs, and dark gray tail. T. l., Dawson City, Yukon, Can.

cowani Rothschild, like *stonei*, but has the body black, with white rump and gray face. T. l., Near Mt. Logan, B. C.

nigra Millais, very dark brown, or nearly smoky black all over with small rump disk; the darkest of all local races. Only one or two specimens of this race have been collected. T. l., Mountains at the head of the Skeena River.

samilkameenensis Millais, "the smallest of all American local races, and now extinct. Dark brown all over, with small white rump patch, and horns small. These Sheep were evidently a dwarf race, closely allied to *nigra;* and in appearance and size, bore little affinity to the Sheep of East Kootenay and Lilloet, which are of the typical race."[2] T. l., Samilkameen Mountains of B. C.

Concerning the complete intergradation between *dalli* and *stonei* there can no longer be any doubt. Dr. W. H. Osgood says:

"It appears, therefore, that the evidence of the intergradation between the pure white sheep of the Kenai Peninsula and the blackish-brown Sheep of the Stikine River region is practically complete. The change from one to the other is almost perfectly graduated; and corresponds closely to the change in geographical distribution. At the extremes, there is great constancy of characters, but away from the extremes, variation begins immediately, and is greatest about halfway between. It is a conspicuous example of the occurrence in a large mammal of what has repeatedly been found among small mammals."[3]

But a more surprising possibility is the intergradation of *canadensis* (the heavy-horned group) with the white *dalli* (the slender-horned group).

In northern British Columbia, we sometimes find horns that are mid-

[2]The Big Game of Asia and North America, London, 1915, pp. 3–5.

[3]Biol. Yukon, N. A. F., 30, 1909, p. 53.

way in type between the heavy and slender styles; as well as intermediate styles of colour. These may be, as some have claimed, mere hybrids. Others maintain that this points to intergradation; and we must not be greatly surprised if we come eventually to Lydekker's view that there is only one superspecies of Sheep in North America.

Thus, Allan Brooks writes: "Sheep that I killed west of Okanagan Lake, B. C., showed a decided tendency to run into the dark, northwest form *stonei;* but I have seen very light and very dark (almost black) individuals in the same bunch."[4]

Even more pointed are Sheldon's remarks; for they tend to discredit colour as a racial character. Speaking of a band of Sheep that he watched in the Pelly Mountains, he says:

"I was so close that, through my glasses, the colours of all the Sheep were clearly discernible; and I carefully made notes. . . . The majority of them were nearly of the same type as that of some of the Stone Sheep killed on the Sheslay River north of Telegraph Creek on the Stikine, the skins of which are in the American Museum of Natural History in New York. From a short distance, the heads appeared perfectly white, the bodies light gray, intermediate in colour between typical *Ovis stonei* and the Saddle-backed Sheep, so-called *Ovis fannini.* None had necks as dark as typical *Ovis stonei;* a few would be classed as *Ovis fannini.* Four were almost as white as the light-coloured Sheep killed on the MacMillan. Several had lambs strictly resembling their mother in colour. Four of the darkest ewes had white lambs. Three of the whitest ewes had very dark lambs. One dark ewe had two lambs, one white, one dark. The saddle-backed ewes had lambs, singly and in pairs, varying in all shades of colour from whitish to very dark."[5]

Record Horns

The longest horns of White Sheep in Rowland Ward's Book,[6] is from the Yukon, and is owned by Major L. Snyder. Its dimensions (owner's measurements) are: Length, 49¼ in.; girth, 14½ in.; tip to tip, 29¾ in.

The longest of Rowland Ward's measurements is the Yukon head owned by Capt. R. C. Dalglish, R. N. This is: Length, 47 in.; girth, 13¾ in.; tip to tip, 28 in.

Next is the Yukon head in the collection of Wilson Potter, of Philadelphia. Length, 44¾ in.; girth, 14¾ in.; tip to tip, 34½ in.

[4]Personal letter, Dec. 12, 1899.

[5]Wilderness, p. 203.

[6]Records of Big Game, 1922 ed., p. 385.

The most massive head is from Alaska, and is owned by His Majesty the King of England. It is 43½ in. long, and 15½ in. in girth; tip to tip, 26 in. Of equal girth is Surg. C. R. Rickard's Yukon head. It is tip to tip, 29½ in., but only 37¾ in. in length.

Ten heads of 40 in. or more in length are recorded; and 8 heads of 14 in. or more in girth.

Totalling the points of these heads, as a means of appraisal, we find: First, the Wilson Potter head with 94 points; second, the Major Snyder head with 93½ points; third, His Majesty the King's head with 90 points; and fourth, the Capt. Dalglish head with 88¾ points. This, of course, takes no account of beauty or symmetry. The Dalglish head is illustrated. It is a marvel of ovine beauty.

History

Several early explorers mention having seen creatures that may have been the White Sheep. Thus, Mackenzie, in July, 1789, when among the Hare Indians on the Mackenzie River, near lat. 68°, wrote: "Reindeer, Bears, Wolvereens, Martens, Foxes, Hares, and White Buffaloes are the only quadrupeds in their country, and that the latter were only to be found in the mountains to the westward."[7] As this was much too far north for the White Goat, it may have referred to the White Sheep; but is too vague to be of much value.

Richardson, in 1829, describes the Rocky Mountain Sheep;[8] but the illustration he gives is pure white, and may have been the present species, as the horns shown are nearer in type to those of the White Sheep than those of the Brown.

The earliest clear-cut recognition was in 1884, when E. W. Nelson described the pure white Alaskan Sheep as *Ovis montana dalli* (Proc. U. S. Nat. Mus., VII, p. 13).

In 1852, Dr. J. Rae brought a fine adult male specimen of the Black Sheep from the Liard River. In 1885, Col. J. Biddulph described this, and named it *liardensis*. As such, it was labelled in the British Museum, but not published.[9]

In the meantime, Andrew J. Stone, in 1897, secured a specimen from the headwaters of the Stikine River. It was described by Dr. J. A. Allen, and named *stonei* in honour of the discoverer. Now the older name *liardensis* was published, but one year too late.

[7]Voyages from Montreal, 1801, p. 76.

[8]F. B. A., I, pp. 271–74.

[9]See P. Z. S., 1885, p. 679.

During the last three decades, a sort of epidemic craze to name new species has swept over the world of zoology; so that otherwise helpful observers have added grievous and unnecessary burdens to the catalogue of regrettables. There can be little doubt that the last three listed races of Sheep are of this class. Careful revision of the group is much needed.

Range

The map shows, with something like final accuracy, the range of the Thin-horned Sheep. There are no special features, such as outlying groups, for consideration. The intergradation of the forms is nearly perfect, and is set forth in fuller detail on the map and in the illustrations facing page 298 of Sheldon's "Wilderness."

Haunts

In the great, glorious, rugged empire that extends unspoiled from Kootenai to Kotzebue, we still find the Sheep in primitive habit. The evidence of countless hunters and of their photographs, is that the Sheep is a creature of the upland meadows; but retires for rest and security to the adjoining citadels of cliff and peak; as do seabirds that spend their lives roaming the restless sea, yet must, perforce, find on the rocky shore a place in which to rest and rear their young.

Numbers

It is with more than ordinary joy that the naturalist will read the record setting forth the numbers of these superb creatures, as they were, and as they are to-day.

While cruising along the north coast of Alaska, Nelson, in 1881, wrote: "Hundreds of Mountain Sheep skins were seen among the Eskimo."[10]

In Sept., 1915, Dr. Albert B. Jones went a-hunting in the Cassiars, and saw in one day "31 Sheep, some rams"; another day, "8 small Sheep and 1 big ram."[11]

Dr. R. Allen Griffith, who hunted around Tepee Lake, of the Lake Kluane region, Yukon Territory, in 1917, writes that "on reaching the basin at the head of the canyon, we found the valley and sides of the basin clear to the top of the peaks, alive with bands of Sheep. There were surely 2,000 Sheep in sight."[12]

C. W. H. Herdeman, writing from Copper Center, Alaska, July 3, 1911,

[10] Alaska, p. 284.

[11] Field & Stream, July, 1916, p. 253.

[12] Field & Stream, Feb., 1918, pp. 824–25.

MAP VI.—RANGES OF THE BIGHORN AND THE WHITE SHEEP

By E. T. Seton, with assistance of the Biological Survey

Range of the Bighorn and its races: To-day but little changed in actual outline, but numbers within that outline much thinned.

Range of the White Sheep and its thin-horned relatives: Not changed since primitive times.

says: "From my tent as I write this, I can see a thousand Mountain Sheep, ewes and lambs, grazing just at the foot of the Glacier. To the right over the ridge, is the summer range of the rams. I can go there in two hours, and see a hundred bands of from 6 to 12 rams."[13]

A committee of the Boone & Crockett Club, wrote in their report on the game conditions, (p. 23) in 1915, of the Bighorn:

"In Yukon Territory, their numbers are undiminished. In the interior of Alaska, there is little change, except a decrease of numbers in areas tributary to mining camps. If the camps are not long-lived, the numbers are later recruited. On the Arctic ranges, the Eskimo kill great numbers of Sheep, in some places living exclusively on their meat in the winter. When they thin out the Sheep in one region, the Eskimo go to another, while in the former region, undisturbed, the number of Sheep is replenished. Yet there is great danger of Sheep extermination finally—more than in any other part of Alaska. As the Caribou within reach of the Eskimo are killed off, the danger to the Sheep increases. In the eastern section of the Kenai Peninsula, Sheep were becoming scarce. The Secretary of Agriculture immediately prohibited killing them in this section."

Dr. W. H. Chase writes concerning the White Sheep in the Alaskan Mountains: "A few years ago, the writer had the extreme pleasure of viewing a bunch of these beautiful animals, which numbered more than 1,200."[14]

In Sept., 1918, Henry Bannon, hunting in the Cassiar Mountains south of Stikine River, in the Klappan region, "saw 18 rams that day."[15] The narrative shows that ewes and lambs abounded.

Harold McCracken, reviewing "The Game Situation in Alaska," says:[16] "On a trip in 1916 into the Sheep country of the St. Elias Alps district, I saw as high as 200 of these animals in sight at one time, and several herds of around 75. I have information of as many as 1,500 being visible from a single point of view."

In the fall of 1918, William N. Beach, President of the Campfire Club, took a movie outfit to Cassiar, and secured some valuable results. His narrative contains many expressions like "this bunch consisting of 21 rams," etc.

But his numerous trips to Alaska are even better evidence. He writes me:[17]

"During the two trips I made on the northern side of the Alaskan Range

[13]Forest & Stream, July 22, 1911, p. 136.
[14]Outdoor Life, Dec., 1922, p. 416.
[15]Forest & Stream, Sept., 1920, p. 516.
[16]American Forests, June, 1924, p. 328.
[17]Personal letter, March 15, 1926.

in 1922, I camped along various sections of the Range, covering about 200 miles on the northern side of what is known as the McKinley Range. Throughout that section, White Sheep are in great abundance wherever there are good, rugged ridges. They are generally found fairly high up, although there are several places in McKinley Park where Sheep may be found on grassy slopes. We saw various quantities of Sheep each day. The largest number were in the Park on Polychrome Pass, where we counted some 400-odd Sheep. There were 238 in one bunch. These were all ewes and lambs. As we travelled to the westward along the Range, we saw Sheep nearly every day. They were mostly in bands of from 5 or 6 to 15. The largest number of rams that we saw in any one day was 88.

"The Dall Sheep abound similarly in the Endicott Range, also in the Tanana and White River sections. In the latter, they were quite badly thinned out during the Shushanna stampede, but they are now coming back. On the whole, primitive conditions prevail in Alaska, as there are but few settlers inland, and the Indians are on the decrease. The country will doubtless furnish Sheep hunting for a great many years to come."

Home Range

As usual, the home range narrows on investigation. In the Yellowstone Park, the band that ranges over Mount Everts in the summer, merely descends in winter to the canyon of the Gardiner River, not 5 miles away, but 2,000 or 3,000 feet lower. Their whole lives may be spent within a 5-mile radius.

So also, of the White Sheep in Alaska, Sheldon writes:

"The regions where Sheep exist are divided into 'Sheep ranges,' each of which is very limited (only a few miles) in area, and occupied by a group of Sheep which pass their lives on the same range, precisely as do Cattle in the unfenced portions of the West. Except for some mingling at the borders between neighbouring groups, each colony of Sheep keeps to its own range. The Sheep cling so tenaciously to their ranges, that a destructive enemy, like man, usually exterminates them before they will leave. If driven off temporarily, most of them soon return. It is a mistake to think that Sheep are driven from one region to another. Aggressive hunting kills off most of the group, and only a very small proportion migrate to other ranges. This is particularly true in regions where the mountain ranges are not continuous. But when the number of Sheep on a range increases and crowds the food supply, a gradual overflow to other regions takes place, and this overcrowding also causes an irregular migration of Sheep."[18]

[18]Wilderness, pp. 302–03.

The uniformity of their lives and needs is modified chiefly by the weather. But they follow so much of routine that their little homeland is laid out in definite trails which they use with regularity, so that they have been deeply worn by generation after generation.

Harold McCracken, telling of his Sheep hunt in Alaska, says: "I was following a trail which the Sheep had actually cut from 12 to 18 inches deep in the mountain-side; and where it crossed a small canyon, it was well cut in the solid rock."[19] What a story that tells—what myriads of feet—what centuries of use!

Social Order

The social order of the Thin-horned Sheep is like that of the Bighorned. I know of no differences.

Except during the rut, the big rams form a group by themselves, and are singularly harmonious, considering what awful rows they had not so long ago. When any trouble appears in this group, "*Cherchez la femme.*"

The ewes and lambs, new and last year's, form another band that are under leadership of a wise old lady who is, most likely, the grandma of the lot. The 3-year-old rams in the big-boy stage, being not proper company for the ladies, and not quite fit to run with the men, form a third group, as a sort of hanger-on of the ewe-band.

As among wild geese, there is always one with head up, looking around —a self-appointed sentinel. Concerning this supposed official, Sheldon says:

"After eating some lunch, I followed the sheep-trail for some distance along the crest, when I saw on an opposite mountain, separated from the one on which I was walking by a deep, narrow valley, a large band of Sheep feeding well up the side. I counted about 80 in all, mostly ewes and lambs, with a few small rams. Descending over the steep, broken rock talus to a ridge, I walked along it until the Sheep were not more than 500 yards distant in a straight line across the valley, and, concealing myself among the rocks, I watched them. Some were feeding, some lying down. About 10 three-year-old rams kept together, slightly separated from the rest. A hundred yards above was an old ewe lying on the slope, keeping an alert watch both up and down. In half an hour, when another old ewe walked up to her, she rose and went down to feed among the others, while the ewe above lay down to replace her as the 'sentinel' to protect the band.

"As the 'sentinel'! Never was the posting of guards better illustrated; and what a positive conclusion one could have drawn if not especially aroused to continue watching and observing! Half an hour passed, while

[19] Field & Stream, March, 1922, p. 1025.

the Sheep below were feeding, resting, always alert, and on the lookout for danger; the lambs were nursing and frisking. Then the 'sentinel' rose, descended, and mingled with the others, leaving none on guard in her place! Thus entirely unprotected they continued feeding, until the lengthening shadows warned them of evening, and they slowly fed upward toward the crest to lie down for the night. During all the time that I watched them, the lambs kept playing, chasing each other, butting, and running back and forth."[20]

Manners and Mating

As in the other Mountain Sheep, the present ruts in December, the craze lasting 6 weeks, from the last of November till the first week of January.

One ram appropriates all the ewes he can get, and seems good for as many as 40 or 50.

The young are born between mid-May and mid-June. They number usually 1, but occasionally there are 2; 3 have not been recorded. This chapter of their lives is vividly set forth by J. Alden Loring in the section which ends this Life.

They are weaned in August, but continue closely attached to the mother till the following May, when each has his nose put out of joint by his little baby brother now arriving. Still, he remembers that this is his mother; and, in some sense, follows her lead till his third year. Then he graduates into high school; that is, joins the semi-detached bachelor group that stands midway between the nursery and the club. This means the mother's ewe-band on one hand; and on the other, the care-free band of big, irresponsible father rams.

With these, they continue till, in their fourth or fifth year, they fight their way to a footing among the big fellows, and so establish their right to perpetuate the race.

Enemies

In the bleak, white uplands of his great North Kingdom, the White Sheep has but few enemies that can daunt his high courage. For the plague and burden of the snow, he is so well equipped that it becomes his guardian and his friend.

The mosquitoes and the gad-fly hound him little, if at all.

Leaving out the all-destroyer, man, his enemies are Wolves, Lynxes, Bears, Wolverines, eagles, Foxes, etc. But these are dangerous only while the Sheep is a helpless lamb.

[20]Wilderness, pp. 202–03.

Wolves and Lynxes are swift enough to menace the old Sheep, but their success is small. The following by Charles Sheldon shows that, in Alaska, the Sheep finds in the Lynx an habitual enemy. On Dec. 8, 1907, while at timberline, headwaters of the Toklat River, on the north side of the Alaskan Range, Sheldon saw some Sheep behaving strangely.

He says: "Going back to the creek bed, and proceeding, I soon saw on the ground, at the foot of the slope, a Sheep, apparently dead, with a bloody head. Then immediately a Lynx squatted just beside it. I was a hundred yards off, and the Lynx was looking at me. It quickly ran up the creek a short distance, and disappeared among the rocks. Following rapidly, I saw it sitting on a ledge and shot it. Bringing it back to the Sheep, I found that it had just pulled the Sheep down the slope. I had missed seeing it by a minute only.

"The snow revealed part of the story. The Lynx had waited on a rock, about 500 feet up, and as the ram (about 2 years old) crossed the slide, the Lynx sprang on its back, and fastened its teeth in the left eye. Together they came down the slide, and at the bottom, a struggle ensued. The Lynx lost its hold, and fastened again to the right eye. Not another tooth mark was on the Sheep. Both eyes were completely gouged out, and had discharged great quantities of blood.

. . . . . .

"The ram weighed 125 pounds.

"Jan. 3, 1908, I was at the base of Mt. McKinley, 70 miles distant from the Toklat, and saw on a mountain-side, high up in the slope, a Lynx feeding on a Sheep. Going up there, the Lynx ran before I could shoot it. The snow above told the story. The Lynx had waited on a rock above. Four or five Sheep had passed it going down, but did not come within 10 feet of the rock. When they got below—the slope was very steep—the Lynx rushed down behind them, and sprang on the back of a ewe and fastened its teeth to her left eye only. Both struggled 300 yards down the slope, and the ewe had died before the Lynx lost its hold. . . . The ewe was 3 years old, and larger than the ram.

"Lynx tracks were common all winter in the Sheep mountains, and several times I saw them near Sheep among the rocks, and once saw one trying to stalk a band of large rams."[21]

The Lynxes were not especially large, as they weighed 18 pounds and 22 pounds respectively. The skulls of the Sheep, etc., are now in the National Museum at Washington.

[21]Forest & Stream, Jan. 30, 1909, p. 173.

The Wolf takes a continual toll of the Sheep, when he can find them away from the crags. John C. Augsberry, of California, with his guide, Tom Dixon, of Kluane, saw 5 places in one day on the St. Clair River where Wolves had killed rams. "They saw Wolves in the act of cutting out single rams from a bunch, and Mr. Augsberry succeeded in killing one of the Wolves engaged in such a foray. The ewes and lambs kept to the higher ground and rocks, and were not molested."[22]

The Wolves and the Pass

As an offset, I am glad to quote the following account of an attack by Wolves.

Harry E. Lee, the well-known Alaskan sportsman, describes a thrilling episode in White Sheep life. He had heard Wolves in the region, and found not a few tracks. He climbed to a good lookout.

"I could not see a living creature in any direction," he says. "I sat there for about half an hour, and was contemplating a return to camp, when I heard on the opposite side of the canyon a number of sharp, quick barks or yelps. I looked in the direction of the sound, but could not see a thing. Presently I discovered two Sheep coming down the mountain, and about 10 yards behind them, 5 Wolves. The pursuers seemed to be gaining on their prey when they reached the cliffs; but the Sheep plunged down, down, until they reached a wide shelf, and here immediately they turned around and with heads to the enemy, waited the onslaught.

"The Wolves came on barking at every bound, and springing from ledge to ledge. The Sheep stood perfectly motionless. The foremost Wolf gained the shelf. Quick as a flash, the Sheep struck him and hurled him off the cliff down to the depths below.

"The other four came dashing on. As they stepped on the fatal ledge, each one was sent thundering down in the same way. I was spellbound for a few minutes. I would have given almost anything I possessed for a picture of the scene.

"The Sheep walked leisurely to the edge of the precipice and looked over; then gazed around on every side and leisurely walked back and lay down. I could easily have killed both these Sheep, but I felt so proud of them that I would almost have sent a shot at any man who would molest them.

"I am told on good authority that a large ram will defend the whole flock against any living animal that would give battle on their own grounds. I could not believe this until I saw what I have described; but now I am

[22]Editor, Field & Stream, Jan., 1920.

Plate LXXXIII.– Remarkable Heads of White Sheep

PLATE XCI.—BUFFALO HERD IN WINTER

Drawing made in 1892, by E. T. Seton

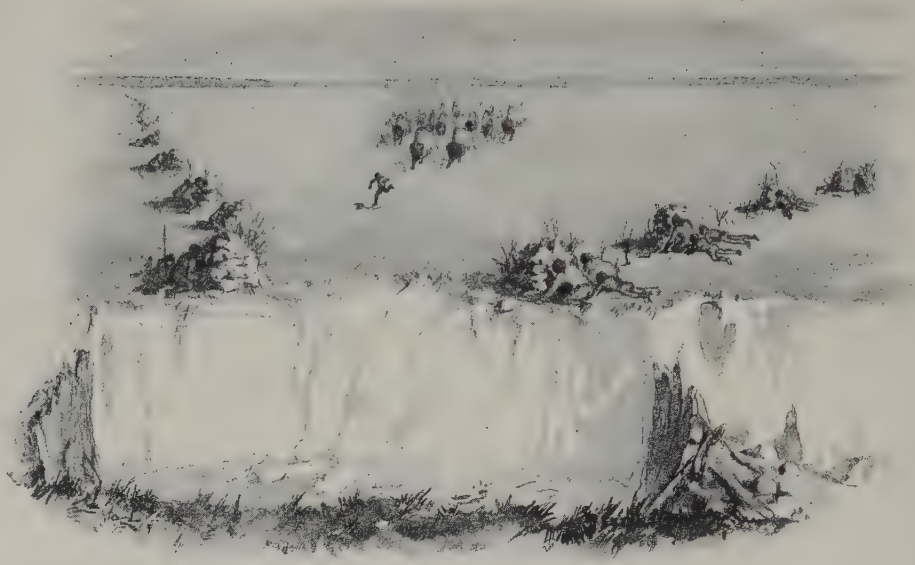

PLATE XCII.—LEADING THE BUFFALO INTO THE POUND

PLATE XCIII.—HEAD OF BUFFALO COW

By E. T. Seton

convinced that a harmless-looking Sheep can make as fierce a fight as any animal I ever saw, when called on to defend his own rights; and so quick and effective are his blows that nothing can withstand him.

"I walked down the ravine to where the Wolves had been thrown over, and saw the mangled forms of three of them at the bottom. The other two had caught on the lower ledge and were also shattered to pieces on the sharp rocks."[23]

Good Fellowship

Reference to the Lives of Coyote, Fox, Badger, Mink, and Caribou shows that these creatures form friendships with other animals—those of a different species. It is a pleasure to add the White Sheep to the list of kindly spirits.

The following incident is supplied by Morris L. Parrish who, with Wilson Potter, both of Philadelphia, made a hunting trip on Kenai Peninsula in the fall of 1912. Parrish and his guide, H. E. Russell, were the witnesses. Parrish writes:

"Three rams were on the side of a hill, walking along in single file, and a Cross Fox was walking with them, he jumping up and biting their faces in play, and they butting him gently along in front. When they lay down, he lay down too; and they were evidently travelling together, and the best of friends. We watched them for fully 15 minutes through the glasses at about 300 yards. There was another ridge, some 200 yards farther on, and we crawled along this, but when we reached it, the rams had disappeared. We saw the Fox some distance off, but could not find the Sheep again."[24]

The Loring Lamb Hunt

Of all the hunts that I have read, none has interested me more than J. Alden Loring's Alaska expedition after the White Sheep. He set out, not on a head-hunt, but planning to bring back alive for careful raising, some lambs of the wild stock. Because the experiment was to be carried on in the East, in a damp region, and near sea level, the hunter elected to secure the Alaska Sheep rather than that of the high Rockies. The story of the bloodless hunt, so nearly a success, I gladly give, as guide and incentive to others who would follow up the good work.[25]

On April 24, 1901, he landed at Tyonek, Cook's Inlet, Alaska; and secured the services of H. H. Hicks, who, with two Indians, formed his party.

[23]Forest & Stream, April 15, 1899, p. 283.

[24]Quoted in Journ. Mamm., Nov., 1921, p. 234.

[25]See N. Y. Zool. Soc. Bull., Sept., 1902, pp. 46–55.

On the Knik River Mountains, 75 miles away, they began in mid-May to seek for ewes that were about to lamb. From various good outlooks they located two promising bands of Sheep. These they could keep under observation, as Sheep travel but little while they feed; they are satisfied with a very small home range, as is the well-known habit of their kind. For a week they watched these two bands, and oftentimes Blackbears with their families drifted across the scene.

"Hicks reported," he writes, "that for two days, one of the ewes had acted strangely, restless when feeding, lying down more than usual, and taking little interest in the wanderings of its associates. This naturally led us to believe the long-looked-for time was near."

The Capture of Little Billy

Returning to camp after some ten days' watching, he says: "Much to my joy, I found Hicks seated on a log, with a beautiful snow-white lamb standing rather unsteadily in front of him. The story of its capture is best told in the words of Hicks.

"'For some time after reaching the place where we [Hicks and Billy, the Indian boy] had watched the Sheep, the one that had acted so strangely could not be found. An hour or so later, it walked out of a gully among the rocks, a lamb following. It was about half a mile above timberline, in the centre of a mass of rocks and crags. We mapped out our route and started in pursuit. For some time we kept together. . . .

"'It took an hour and a half to climb to the point where we were to separate. Billy then followed up a canyon to the right of the Sheep, while I made a detour to the left, intending to get above them. Progress would have been easier had we been able to take advantage of favourable places without being seen. We knew that at the first sign of danger they would take to the inaccessible peaks, and probably cross the range. Our plan was that Billy should creep close to the lamb and conceal himself, while I worked between it and the other Sheep; then, when they were out of its sight behind the rocks, we would scare them, and immediately advance on the lamb.

"'The plan worked admirably. Some hard climbing was necessary before I reached a suitable position. Rising, I allowed the Sheep to see me, and an instant later they were bounding up the mountain. The lamb was on a narrow shelf, and by creeping up from both sides we blocked all chances of its escape. It scampered back and forth, but did not attempt to jump over the ledge. We worked slowly, and it quieted down until at last it ran into Billy's arms, and was our captive.

"'It took its capture as a matter of course, and did not bleat or struggle until we started for camp. In descending difficult places one would climb down, and the other hand him the lamb and the guns. I carried the lamb, and its heart beat so rapidly we paused many times for it to rest and become quiet before reaching camp.'

"This specimen was a male, a beautiful little creature not more than a day old, 10½ inches high at the shoulders, weight 8½ pounds. He scampered about with remarkable agility. He was attached to Hicks, and followed him from place to place, but when I attempted to care for him while Hicks ate, he became restless and bleated like a domestic lamb.

"Like all young ungulates, he stood with his feet braced well apart, and attempted to jump over obstacles instead of going around them. As he was warm, we waited before feeding him, then gave him his first meal of condensed milk, ¼ milk to ¾ water, from a nursing bottle. Feeding proved to be an awkward undertaking, as the lamb did not understand what was wanted. Half an hour after arriving in camp, and about fifteen minutes after feeding, he was taken with diarrhœa.

"Using poplar saplings, we made a corral about ten feet square, and placed him in it; but he was not contented unless someone was near. Whenever I left, even if for a minute only, he ran back and forth, bumping his head against the bars, bleating, and attempting to jump out. At night I made my bed in one corner of the pen, and as I expected, he shared it. He lay close to my face, and frequently snuffed at it. At last becoming sleepy he closed his eyes, and at each throb of the heart his head sank lower and lower until it rested on my cheek. It was a windy night, and at every strong blast he awoke with a start and sniffed my face, bleating frequently. I could not move without disturbing him, and often lay in one position until my bones ached.

"I got little rest until five o'clock in the morning, and then had not more than an hour's sleep until 'little Billy,' as we named him, was walking all over me. He was very nimble, sometimes trying to jump out of the enclosure. He liked to get as high as possible and whenever I raised the blanket he tried to climb it."

A fierce storm now set in and the hunters were held up for three days.

"During this time," says Loring, "I was confined to camp, caring for the lamb, and also endeavouring to break up the chills and fever which attacked me every other day. My illness subsided, but the lamb became worse, and it was soon evident that its condition was hopeless. In spite of the medicines administered, it became greatly emaciated, soon lost its appetite, and on the morning of May 27th it died lying on my blankets."

The Second Snow Lamb

They now travelled farther, and found a band of 17 Sheep, presumably all ewes.

"It was not long before a lamb and ewe were sighted. They were in an awful mass of rocks and crags, near the summit of the range.

"As we were about to give chase, the ewe started up the mountain in great haste. Her actions were puzzling, for we were sure she had not seen or scented us. At last we concluded that she was attempting to exercise the lamb. After describing a circle, she returned and lay down near the spot from which she started."

A long detour and some heavy climbing were necessary now. Then Hicks went ahead to locate the game.

"He returned with the information that three hundred yards above us there was another ewe, but he was unable, without exposing himself, to tell whether it had a lamb. We retraced our steps to a rocky peak, and under its protection sneaked to within a hundred yards of the Sheep, when we saw a lamb lying by it.

"The mother seemed reluctant to leave the little one, even for a moment, but at last she walked around a point and out of its sight. Then we allowed her to see us, and she took fright, at once. While attempting to get above the lamb, we lost sight of it. Hicks immediately climbed a cliff, and after sighting it, signalled its position to me. I sent one of the Indians to the opposite side, and stationed the other below the lamb, while I came up from the left. Everything being in readiness, Hicks climbed down from above and blocked the only passage. The lamb was resting quietly at the base of a cliff. Then we all moved forward from different directions, and soon had surrounded and captured it. It was not more than a few hours old, and because of its weak condition scarcely made any attempt to escape.

. . . . . .

"As we were about to return to camp, an eagle suddenly darted round the face of the cliff, and with wings half closed swooped close over our heads. It seemed as if the big bird intended to rob us of our prize; but probably it was as much surprised as we, for it departed as suddenly as it came. Had it been an hour earlier, and the mother and lamb separated by even a few feet, the latter surely would have been captured and devoured.

"We placed our captive lamb in a tiny hammock made out of the bottom of a flour-sack, doubled its feet under it naturally and pinned the

sides of the hammock over its back. With hammock and lamb hanging from Hicks's neck by a stout cord, the head of the captive protruding very demurely, we began to descend toward our mountain camp."

The Third Lamb

When about a mile off they saw Billy, the Indian boy, running down the mountain at breakneck speed, and ascertained through the glasses that he also carried a lamb, one which he had captured after an exciting chase—a chase which proved, alas, too much for the little one's strength; for it was so overcome that it lay still, and did not attempt to move.

Some unexpected testimony from one of the Indians at this time convinced Loring that the Sheep's milk was not thin and weak as tradition had it, but as rich and thick as cream; so he decided to try Nestle's Baby Food in the place of condensed milk, as that seemed more like what nature provides.

"The lambs were perfectly contented in the pen which we made for them. The one Billy captured was so fagged out that, regardless of the noise made about camp, it lay down and slept soundly for two hours. The other lamb sniffed at him a few times, then lay down and watched us with much curiosity. The mosquitoes were now so troublesome we made a mosquito-proof tent to place over our two small captives."

Next day, the first lamb was in good condition, and evidently much stronger. But one of the Indians had been using his gun, which with the disturbance of the lamb chase, made it probable that all the Sheep had moved out. So the hunters also moved from that mountain.

"The lambs behaved well on the way down. Neither of them struggled much, and they appeared interested in all that went on. About noon the one I carried showed symptoms of illness, and on arriving at camp I at once began doctoring it.

"A movable wire cage was made, and at night, after taking the lambs into the tent and allowing them to go to sleep cuddled close to me, I covered them with mosquito netting, and placed the cage over all. Whenever one awoke he looked about, and seeing his companion sleeping peacefully, dozed off again.

A Sad Ending

"The smaller lamb became weaker daily, and we feared it was not likely to live long. The other, however, was so strong and healthy we had great hopes of keeping it."

But at night "about 8 o'clock the strongest lamb was taken sick with

the usual disorder, diarrhœa, and by midnight was past recovery." Next morning, June 6th, between 5 and 6 o'clock, to the intense sorrow of their captor, both lambs died.

Loring thinks that the unnatural food may be to blame; but one at least was killed by the nervous excitement of being hunted down, so that it could not have digested any food. In any case, he thinks that it would be a long step toward success in the next attempt made, if domestic Goats, or Sheep in milk, were taken along to nurse the tender little captives.

It is well to remember also that there are many artificial baby foods now available. Experience in the zoo proves that most animals can be raised on them (See Goat Life). Some remarkable successes in raising little orphans have been achieved by the use of lactol—a heaping teaspoonful to a half pint of warm water. These things are easy to carry, and it is to be hoped that another attempt will be made with better equipment. Some time, it is bound to be a success.

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LIFE LVIII—THE MUSKOX

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CIVILIZATION E.T. SETON

Muskox, Musk-Buffalo, Arctic Buffalo or Polar Cattle

Ovibos moschatus (Zimmermann)

(L. *Ovis*, a Sheep; *bos*, a Cow; *moschatus*, musky)

Bos moschatus Zimmermann, 1780, Georg. Geschichte, Vol. 2, p. 86.
Ovibos moschatus Desmarest, 1822, Mammalogie, Vol. 2, p. 492.

Type Locality—Between Seal and Churchill rivers, Keewatin, Canada.

French, *Bison musqué; le bœuf musqué.*
Eskimo, *Oomingmak* or *Oum-ming-mung.*
Chipewyan, *Et-jer-ré.*
Loucheux, *Uk-ki.*
Slavey, *Ota Et-jir-er.*

The genus *Ovibos* Blainville belongs to the family *Bovidæ* or Cattle-beasts. It is characterized by: Large size and oxlike form; neck, short; horns in both sexes, sweeping down, out and up; muzzle all hairy, save a small, naked triangular space between the nostrils; 4 large hoofs on each foot; tail, rudimentary; ears, small; coat, very long, thick and flowing; teats, 4.

It is nearer to the American Buffalo in anatomy than to any other existing animal; and may be described as a form of Buffalo specialized for life on the Polar Plains.

$$\text{Teeth: Inc.}\ \frac{0-0}{4-4};\ \text{can.}\ \frac{0-0}{0-0};\ \text{prem.}\ \frac{3-3}{3-3};\ \text{mol.}\ \frac{3-3}{3-3} = 32$$

In addition to these generic characters, the Muskox has the following:

Size. ♂s: Total length, 80 to 96 in. (2,028 to 2,434 mm.); tail, $3\frac{1}{2}$ to 4 in. (89 to 102 mm.); hind foot, 17 to 19 in. (432 to 483 mm.); height at shoulders, 48 to 60 in. (1,217 to 1,521 mm.).

The bull that Captain Parry killed on Melville Island., Aug. 9, 1820, measured in total length, 82 in.; tail, 3 in.; hind foot, sole to hock, 17 in.; height at withers, 56 in.

The large bull, taken by the Seton Expedition at Aylmer Lake, Aug. 16, 1907, measured: Total length, 96 in.; tail, 4 in.; hind foot, 19 in.; height

at withers, 59 in. This, it should be noted, was in the region of the largest race, typical *moschatus*.

A bull killed by Hanbury in 1896 in the Ark-i-linik River country, stood 55 in. high at the shoulders.[1]

♀s: The 22-months-old ♀ that was secured by the N. Y. Zool. Park on March 12, 1902, measured as follows:[2]

Length of head and body	4 ft. 10 in.
Height at shoulders	3 " 2 "
Height at middle of back	2 " 11 "
Height at hips	3 " 1 "
Length of horns on curve	10 "
Horns apart at base	6 "

Weight. It should be remembered that "cleaned" means gralloched; that is, bled and gutted. In this process, ruminants lose about one fourth of their weight. "Dressed" means gralloched, skinned and trimmed; that is, with head, horns, and hoofs also removed. This reduces the weight to about two thirds of the live weight. These, of course, are rough-and-ready rules, varying with individuals.

Capt. W. E. Parry killed a bull on Melville Island, Aug. 9, 1820, which, according to Dr. Alexander Fisher, weighed as follows: Weight of carcass skinned and cleaned, 421 lbs.; weight of head, skin, and feet, 134 lbs.; estimated weight of entrails, blood, etc., 160 lbs.—giving live weight of 715 lbs.[3]

On Aug. 24, they killed 2 others which dressed respectively 359 lbs. and 368 lbs.[4]

Gen. A. W. Greely records 4 Muskoxen killed on Grantland in mid-July, averaging 377 lbs. dressed,[5] which probably means 600 or 650 lbs. live weight. During 1882, they killed 52 Muskoxen averaging 243 lbs. each of dressed meat.[6] On Sept. 29, 1882, they got a Muskox that dressed 371 lbs.[7]

Hanbury gives the live weight of an average bull at 579 lbs.[8]

The large bull collected at Lake Aylmer, Aug. 16, 1907, weighed

[1]Northland, p. 12.
[2]Zool. Soc. Bull., Sept., 1902, p. 34.
[3]Voy. Disc., p. 251.
[4]As above, p. 258.
[5]Three Years, p. 374.
[6]As above, p. 378.
[7]As above, p. 388.
[8]Northland, pp. 12–13.

850½ lbs., after having been bled, cut up, and dried out for a day. Of the 850½ lbs., the head, hide, and hoofs weighed 125½ lbs., and the paunch, etc., 117½ lbs., leaving 637½ lbs. clean. Therefore, allowing for the loss of blood, it was about 900 lbs. live weight—the record. The skull and teeth show that it was not very old; it was in its prime.

Thus, the evidence goes to prove that the largest individuals are in the southern part of the range, where food abounds; while those from the niggard North are reduced to almost dwarfed proportions by the environment.

Colour. The Muskox is deep brown on head and body, becoming intense black on the chin, breast, and belly; shaded into a conspicuous light brown, almost flaxen saddle in the middle of the back. Ears and head, very dark brown; front legs, dirty white; hind legs below hock, dirty white, becoming white behind and above the hoof; upper side of tail, black; under side pure white, but lost in the long hair of the buttocks, which is black. Lips, in front, white; horns and hoofs, dull horn-gray; horn tips, ivory-white.

Iris, golden brown like that of a Sheep, with small horizontal pupil.

Sexes are alike in colour, except that in the doubtful race *niphoecus*, the female is less black than the male; and has more or less white about the face.

Albino. "On the 18th June," says M'Dougall, "Cape Smyth [Melville Id.] was reached. When about 4 or 5 miles to the westward, Lieut. Mecham observed several animals in a broad ravine between the high lands skirting the sea. One being white, he supposed to be a Bear; but on approaching within 150 yards, the animal proved to be a *rara avis* indeed, being no other than a white Muskcow, with a young black calf, about 4 months old, grazing beside her. A ship's length apart, another cow and calf, both black, were also grazing."[9]

Coat. The coat is of deep, brown dense wool, covering the whole body, overlaid and hidden by long, coarse hair, which on the legs and underparts, constitutes a fringe a foot or more long; at the sides, 18 in. long, on the throat and on the rump, 20 in. or more.

Hanbury says: "I was surprised to notice how little difference there was between the summer and winter coats of the Muskox. At this date, Aug. 12, one would naturally expect the robes to be worthless, but they were quite handsome. The fact is that the long black hair, which often reaches nearly to the ground, is never shed. Once this undercoat of wool has been rubbed and scraped off, the robes are good and certainly worth preserving. The trees and bushes along the river were loaded with this wool, which is very fine in texture, much resembling the pashmina of Kashmir. Bags of

[9]Resolute, pp. 295–96.

this wool could be collected from the bushes. It would be a novelty to have a shawl made of it."[10]

The long, coarse hair, if it falls, is renewed gradually, like the mane and tail of a Horse. Its functions chiefly are to shed the rain and protect the animal from violence. The thick underwool, is, of course, essential to warmth at all seasons.

With a view to experiments in weaving the product, the keepers in the Zoological Park, N. Y., once combed out all the wool of a 2-year-old Muskox at the shedding time—late spring. It was a long and tedious operation, and about one month later (though this was summer and the Muskox is bred for Arctic winter), that particular Muskox died of pneumonia;[11] showing how dangerous a thing it is wholly and suddenly to lay aside one's underflannels.

The skin of foetal calves is covered with short, dark brown, curly hair, and furnishes a favourite material for winter caps in the North.[12]

The Eye. "The projection of the orbits of the eyes in this species is very remarkable; . . . it is probably a provision to carry the eye clear of the great quantity of hair."[13]

This observation applies equally to the tubular orbits of the Buffalo. There are, however, some tubular orbits which serve a different purpose; such as those of the Hippo, the snapping turtle, the frog, and the crocodile, which are arranged so as to be above the water when all else is submerged; also of certain burrowing rodents whose safety lies in being able to see from their holes when their bodies are out of sight.

The Musk. No one has yet located the source of the musk in this species; therefore, it is likely to be the product of minute glands all over the skin.

The practical elimination of the tail is very rare among bovines. In this family, the tail is usually specialized as a fly-flapper. In the Muskox it is, according to Richardson, reduced to 6 vertebræ, much as in the human species.[14] Obviously, the Muskox has found a different and better solution of the fly problem.

It is worthy of remark that the Muskox has abandoned his tail and developed an intensely musky personality; the Muskhog has abandoned his tail and developed a powerful musk-gland on his back; the Musk-deer has abandoned his tail and developed an overpowering musk-gland on his

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[10]Northland, p. 40.
[11]Reindeer and Muskox, p. 16.
[12]Russell, Far North, p. 234.
[13]Parry, Voy. Disc., 1821, App. p. xcx.
[14]Zool. Herald, 1854, p. 81.

belly. All of these animals live in regions where mosquitoes are a pest; maybe the musk is developed for a protection against them.

The Yak furnishes further light on this, for he lives in climate and surroundings like those of the Muskox range. His home is cursed with mosquitoes, but, having evolved no musk, he has developed an enormous bushy tail for a fly-flapper.

Flesh

The flesh of the Muskox is much like beef—like Buffalo indeed. When in prime condition, layers of fat are to be found on the neck, which is then the best part of the animal to eat. Sixty pounds did Hanbury get of this delicious flesh-butter from one bull killed in August. But the fat does not form on the back as it does to make the back-fat in the Caribou.

There is, however, this one bad feature about the beef of this animal: It commonly bears a dominating, insupportable taint of musk. This is strongest in the old bulls, and least in the young calves; strong in the lean animals, and barely perceptible in the fat. But all are, in some degree, permeated with the musk at all seasons of the year.

On several occasions in the August of 1907, I made a meal of Muskox beef. The musk was scarcely noticeable during the meal. But afterward, for hours, I had strong and unpleasant reminders of the experiment.

Gen. A. W. Greely devoted some study to the subject—it was indeed a vital one to him—and writes: "The weight of evidence favours the belief that immediate dressing of the animal obviates the difficulty. An example of the following summer seemed to bear out this opinion: An old bull was killed, which, when running, was said to have exhaled such an odour of musk that it was perceptible at a distance of several hundred yards. It was naturally supposed, though he was immediately dressed, that the meat could not be eaten. To avoid prejudice, I had a quarter served without the knowledge of anyone except Sergeant Brainard, and the meat proved free from taint or musky flavour."[15]

Horns and Record Heads

The horns are unlike those of any other animal in America, and suggest the S-bent weapons of the African Buffalo. They give a fair idea of the animal's age. Warburton Pike says:

"The animals that we killed in this band were of various ages, and it was interesting to note the growth of the horns in different specimens. They begin in both sexes with a plain straight shoot, exactly like the horns of a domestic Calf, and it is then impossible to tell the male from the female

[15] 3 Years, p. 141–2.

by the head alone. In the second year, they begin to broaden out, and the bull's horns become much whiter and project straighter from the head than the cow's, which are beginning already to show the downward bend. At the end of the third year, the cow's horns are fully developed, and I do not think they grow much after that age; with the bulls, however, the horns are just beginning to spread out at the base, and it is not until the sixth year that the solid boss extends right across the forehead, the point of junction being marked by a slight crack into which the skin has been squeezed during the growth of the horns. A curious fact is noticeable in the horns of the young bulls before the boss has begun to form; they are quite soft and porous at the base, and can easily be cut with a knife; when once the boss has grown, the horn is as hard as a rock. I made careful inquiries of the Indians on these points, and they told me that, except in the case of very young or very old animals, they could always tell the age of the Muskox by a glance at their horns."[16]

The best pair of horns listed in Rowland Ward's Book (1922) for the Barren-grounds of Canada, is in the possession of N. J. Dinnen. It is given as follows: Length, 33 in.; breadth of palm, 12½ in.; tip to tip, 24½ in.

Next to this is J. C. Phillips's head: Length, 30¼ in.; breadth of palm, 13 in.; tip to tip, 30¼ in.

Next is Dr. M. E. Johnstone's Greenland head: Length, 29 in.; breadth of palm, 11 in.; tip to tip, 28 in.

Then comes G. L. Harrison's head from Arctic America: Length, 28¾ in.; breadth of palm, 13½ in.; tip to tip, 23¾ in.

All of the foregoing are owner's measurements. The best head listed with Rowland Ward's measurements was owned by David T. Hanbury, and taken in the Barren-grounds. It is as follows: Length, 27¾ in.; breadth of palm, 10 in.; tip to tip, 27½ in.

In the collection of E. W. Darbey, of Winnipeg, is a superb head which I measured as follows: Length, 30 in.; breadth of palm, 9½ in.; tip to tip, 27 in.

If we accept these figures and appraise these heads on their totals, we have the following:

The Phillips	head totals		74¼	points
" Dinnen	"	"	70	"
" Johnstone	"	"	68	"
" Darbey	"	"	66½	"
" Harrison	"	"	66	"
" Hanbury	"	"	65¼	"

[16]Barren Ground, p. 109.

Races

The following forms are recognized in Allen's Monograph:

moschatus Zimmermann, the typical form, a large brown animal. T. l., between Seal and Churchill rivers, Keewatin, Canada.

wardi Lydekker, grayer in colour, with more or less white on head; usually a large white patch on the face. T. l., East Greenland.

niphoecus Elliott, a small race; the males nearly all over intense black; the females and young, with white about the head and face. T. l., Head of Wager River, N. W. T., Canada.

(N. B. Dr. J. A. Allen makes *mackensiensis* a synonym of *moschatus* and *melvillensis* a synonyn of *wardi*.)[17]

History[18]

The first published account of the Muskox appeared in 1720. It was by Jérémie, a French officer who was in charge of Fort Bourbon (now York Factory), on the west coast of Hudson Bay at the mouth of the Hayes River, from 1697 to 1714; at which time Canada was yet a French possession. From this point (about latitude 57°), he made journeys northward and westward. In the country between the Churchill River and Seal River (in latitude 58° to 60°), he found the Muskoxen. His account of the Hudson Bay country, in which he gives a description of this animal, first appeared in a collection of voyages published at Amsterdam by Bernard, and is entitled "Relation du Détroit et de la Baye de Hudson"; his account of the *Bœuf Musqué*, or Muskox, being the first published description of the animal, and the only one for the next 75 years based on actual observation. It is here given at length in English.

"At 15 leagues from the Danish River [Churchill] is found the Seal River, so called because there are many big Seals in that locality. Between the two rivers, there is a kind of Ox which is named Muskoxen, because they smell so strongly of musk that at certain seasons of the year it is impossible to eat them. These animals have a very beautiful wool; it is longer than that of Barbary Sheep. I brought some of it to France in 1708, and I had it made into stockings, which were more beautiful than stockings of silk: I still have left here a little of that wool. This I should have the honour to send you, if I thought that it would please you, to make an experiment with it by some clever workmen.

[17]Muskox Monog., p. 177.

[18]The facts are largely drawn from J. A. Allen's Monograph.

"These Cattle, which are smaller than ours, have, nevertheless, horns much thicker and longer. The roots joined together on the top of the head, form a thick helmet, and descend alongside of the eyes almost to the throat. The end turns upward, and forms a crescent. Some of them which I have seen are so massive, that being separated from the skull, the two together weigh 60 lbs. They have very short legs, so that the wool hangs always to the ground when they walk; this makes them seem so deformed, that one can hardly tell, at a little distance, at which end they have the head. There are not many of these animals; what there are, the savages will very soon destroy if they are not restrained from hunting them; in addition to which, owing to their short legs, they are unable to run away when the snow is deep, so they are easily killed with thrusts of the lance."[19]

This earliest account of the Muskox is quite correct, except in the weight given for the horns, "60 lbs." Of course they are nothing like this. Horns and skull together weigh about 20 lbs. when dry; or possibly, in one of unusual size, head and horns in the flesh might weigh 60 lbs. Nevertheless, this error has been repeated by one compiler after another, usually without credit.

Thus Jérémie's account of the Muskox was republished nearly in full by Charlevoix in 1744, from which source (as though it were the original), Jérémie's description of the Muskox has usually been quoted.

Dobbs, also in 1744, gave an abridged version of Jérémie's account of the Muskox, which, as he omitted to give Jérémie as his authority, has long passed for original observation; whereas it evidently rests wholly on Jérémie. Ellis, who is also cited as an original source of information, merely made, in 1748, an incidental reference to the habit of the Eskimos of the Hudson Bay region of wearing a cap "made of the skin of a Buffalo's tail" to "keep off the Musketoes."[20]

This is another important error, for, granting that Ellis meant the Musk-buffalo, it has no tail, practically. It is, as Hearne pointed out long after, the long hair from the throat and chest that is used by the Esquimaux to make their musketto wigs.[21]

"The narrative of the voyage of the ship *California* published in 1749, states that a hunting party from the ship saw '3 Buffaloes, a Bull Buffalo with 2 Cows,' in August, 1747, on the west coast of the northern part of Hudson Bay. They apparently killed some of them, as they took some of the flesh to the ship, and considered it 'remarkable that the flesh of

[19]Relation, pp. 314–15.
[20]Voy. to Hudson's Bay, p. 232
[21]Journey, p. 138.

the Buffalo tasted Musk, and the Heart especially so very strong, that few could eat it.' The animals are described as 'much lower than a Deer, but larger bodied,' and as having short legs and very long hair; and the 'Bull's horns resembled an *English* Ram's; they run a good pace, and climbed nimbly up the Rocks.'[22]

"The second important contribution to the history of the Muskox is the account by Samuel Hearne, who during the years 1769–72, traversed the range of the Muskox from the mouth of the Churchill River westward and northward to the mouth of the Coppermine River. His observations on its habits, distribution and molt are still of the highest interest." They are, indeed, so complete and reliable that I have used them very fully in this Life.

Finally, in 1780, guided by the second-hand descriptions of Charlevoix and Dobbs, Zimmermann described and named the Muskox *Bos moschatus*.

Prehistoric Range

The ancient and prehistoric range of the Muskox seems to have been the whole north Polar region, and southward to cover most of what is now Canada, and the northern half of Europe and Asia. But the remains that justify this statement are mostly of the Pleistocene Period, or during the last Glacial Epoch.

Among fossil records that date back to Pleistocene days, the following are of interest:

In Klondike district, R. G. McConnell found remains of Muskox, Mammoth, Buffalo, Bear, Mountain Sheep, and Mountain Goat, associated in the "low, level, Creek Gravels, probably Pleistocene."[23]

Upper Porcupine River, Yukon, is represented in the British Museum by a "hinder portion of the cranium of a small individual with a part of the horn-cores" from the Pleistocene deposits.[24]

A tooth of a Muskox was found in the Pleistocene Gravel near Midway, B. C. This is on Rock Creek, 8 miles above its junction with Kettle River, 4 miles north of the U. S. boundary; i. e., long. 119 W., lat. 49 N. Dr. George M. Dawson records a Muskox skull from the old gravel near Edmonton, Alta.[25]

On the map are additional records copied from J. A. Allen's map.

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[22]Drage, Voyages, 1749, II, p. 260.

[23]Rep. Klondike Gold-fields, 1905, p. 28B.

[24]R. Lydekker, Cat. Fos. Mam. Br. Mus., Pt. II, 1885, p. 38.

[25]L. M. Lambe, Ottawa Nat., Apr., 1907, pp. 15–16.

These seem to carry the Muskox south to Iowa, Indiana, Michigan, and Pennsylvania.

Packard says on p. 266 of his "Labrador Vertebrates": "The Labrador Eskimo name of *Bos moschatus* is Umingak." Then adds on p. 270: "As noticed in the list above given, the Labrador Eskimo have a distinct name for the Muskox. It is naturally inferred from this interesting fact that this species must formerly have ranged as far south as lat. 56°–58° on the Labrador Peninsula."[26]

This very poor evidence is absolutely all I can find to show that the Muskox ever inhabited Labrador. Wilfred Stearns was mistaken when he recorded a Muskox "relic" from Labrador on the authority of Packard. I find no statement but the above.

In the Old World also the Muskox was widely dispersed. Lydekker says that its range was by no means limited to the Western Hemisphere. Crossing Behring Strait, remains of these animals occur in the tundra of Siberia as far westward as the Obi River. From this region, 2 skulls were brought by Pallas.[27]

These, however, are not recent remains. They may be pre-glacial, and may represent a different species.

West of Mackenzie River

Fixing the range of our Muskox in early historic times—i. e., up to 100 years ago—is nearer our present purpose than the study of fossils. Apparently it was distributed over all of northern Canada, Alaska, and Greenland. The whole region that was bare of ice in summer, and north of the timber line on the map, was probably the range of the species up to 1800.

The records which show the recent dispersal of the Muskox in the Western Tundra are as follows:

First, the much-quoted "Muskox remains" found in the ice cliff of Eschscholtz Bay. Of this, I have made a full investigation.

On several pages of Beechey's Narrative[28] are references to Muskox remains associated with those of the Elephant on Eschscholtz Bay.[29]

In the Appendix, Vol. II, p. 595, Prof. William Buckland, who reported on these fossils, says that only one Muskox specimen was brought. "1 skull with horns attached, incomplete and very modern." Again on p.

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[26]List of Vertebrates observed at Okak, Labrador, by Rev. Samuel Weiz, with annotations by A. S. Packard, Jr., M. D., Proc. Bost. Soc. Nat. Hist., March, 1867.

[27]Wild Oxen, Sheep and Goats of All Lands, 1898, p. 145.

[28]Narr. Voy. Northern Pac., 1831.

[29]As above, pp. 322, 323, 324, Vol. I.

597, he says of this: "Head of a Muskox with the external case of the horns still attached to it, which was brought home with the fossil bones, and was found with them on the beach at the bottom of the mud cliff of Eschscholtz Bay; but so slightly decayed that it seems to have been derived from a carcass that has not long since been stranded by the waves. This head of a Muskox is not engraved, as it cannot be considered fossil."

On p. 606, Buckland suggests that this carcass probably drifted there on some water current, as evidently it was not coeval with the Elephant's bones.

On p. 324, Beechey says of an Eskimo who joined them: "His party lived a long way up Buckland River (which is the small stream entering Eschscholtz Bay from the south), and were acquainted with the Muskox; which I am the more particular in remarking, as we had never seen that animal on the coast."[30]

In short, the Muskox was still found in Alaska, but not at that place; and the only specimen seen was a flood-borne skull that happened to get stranded on a mud-bank near the ice-cliff. But it was a recent specimen, and merely the southmost record for Alaska.

"From Indian information," says Richardson, "we learn that to the westward of the Rocky Mountains, which skirt the Mackenzie, there is an extensive tract of barren country which is also inhabited by the Muskox and Reindeer."[31]

According to John Murdoch, just before leaving Point Barrow, a skull of a Muskox "was brought in by one of the trading parties from the eastward. . . . In the hurry and excitement of the time, we neglected to find out more accurately the locality from which it came. The party had been as far east as the Colville, and the skull may have been brought from there. The natives knew the animal well, and called it by nearly the same name as the eastern Eskimos, but none had ever seen it alive."[32]

Russell says: "The Muskox was formerly common between the Mackenzie and Behring Straits, as evidenced by the remains which are scattered over the tundra. The oldest natives at Point Barrow say that their fathers killed Muskox which were then abundant."[33]

The most interesting and detailed record of all is by Charles D. Brower, who has spent most of his life as a trader at Pt. Barrow, the northmost point of Alaska. He writes to the New York Zoological Society as follows:

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[30]Narr. Voy. Northern Pac., 1831, p. 324.
[31]F. B. A., I, p. 276.
[32]Rep. Exp. Pt. Barrow, 1885, p. 98.
[33]Far North, p. 235.

Statement of Charles D. Brower [*May, 1911*]: "I have lived at or near Point Barrow, Alaska, for 26 years. When I first went there (1884) there was still alive an old Eskimo native who had killed Muskoxen with bow and arrow. Although I was then unable to understand the language of the natives, a few years later I was told the story by a man who, when he was a small boy, had gone hunting with his father and family, and had seen his father kill Muskox in this section.

"The man's name was Mungelo, and he was a native of Cape Smythe village. At the time Maguire [of the *Plover*] wintered at Point Barrow [1853] he was 2 or 3 years old. (This is given to establish a date.)

"A few years after this, times were hard at Point Barrow, and no Seals were to be had during the winter. The natives were very hungry, many dying from starvation. Mungelo's father packed his sled and went inland to the southeast of the village, about 9 miles, camping on the banks of a small river called Oo-ming-muc, which in the Inuit language, means Musk-ox. It is one of the tributaries of the Koog River, which empties into Wainwright Inlet.

"Here Mungelo's family hunted all the spring, and killed many Muskoxen, and saved much meat, which Mungelo's father afterward gave to his unfortunate friends who were starving.

"In travelling around the northern part of Alaska, I have many times seen Muskox skulls lying about on the tundra, and at times have taken them to my station at Cape Smythe. Only once was I fortunate enough to find a skull with the horns attached to it. That was in the summer of 1895. I was on a hunting trip about 100 miles east from Point Barrow, on the shore of a large lake, called by the Eskimos Tashispun, just west of Colville.

"There I found a skull with its horns still attached, and in a fairly good state of preservation. The under side of the big bend in the horns was decayed, where they had been resting on the ground. This skull I took home with me, and kept it for over 2 years, when I gave it to Mr. E. A. McIlhenny, who spent the winter of 1897–98 at Cape Smythe, collecting all kinds of natural history specimens.

"I have also at the present time a Muskox skull without horns, at my home at Point Barrow, Alaska."[34]

In Dec., 1916, the N. Y. Zoological Society received from this same observant trader a Muskox skull, that he found associated with Mammoth and Mastodon remains in the extreme north point of Alaska. The skull was quite fresh-looking—had apparently not been weathering for more than 30 years. Its lower jaw is missing, but the horns are intact,

[34]Zool. Soc. Bull. May, 1911, pp. 754–55.

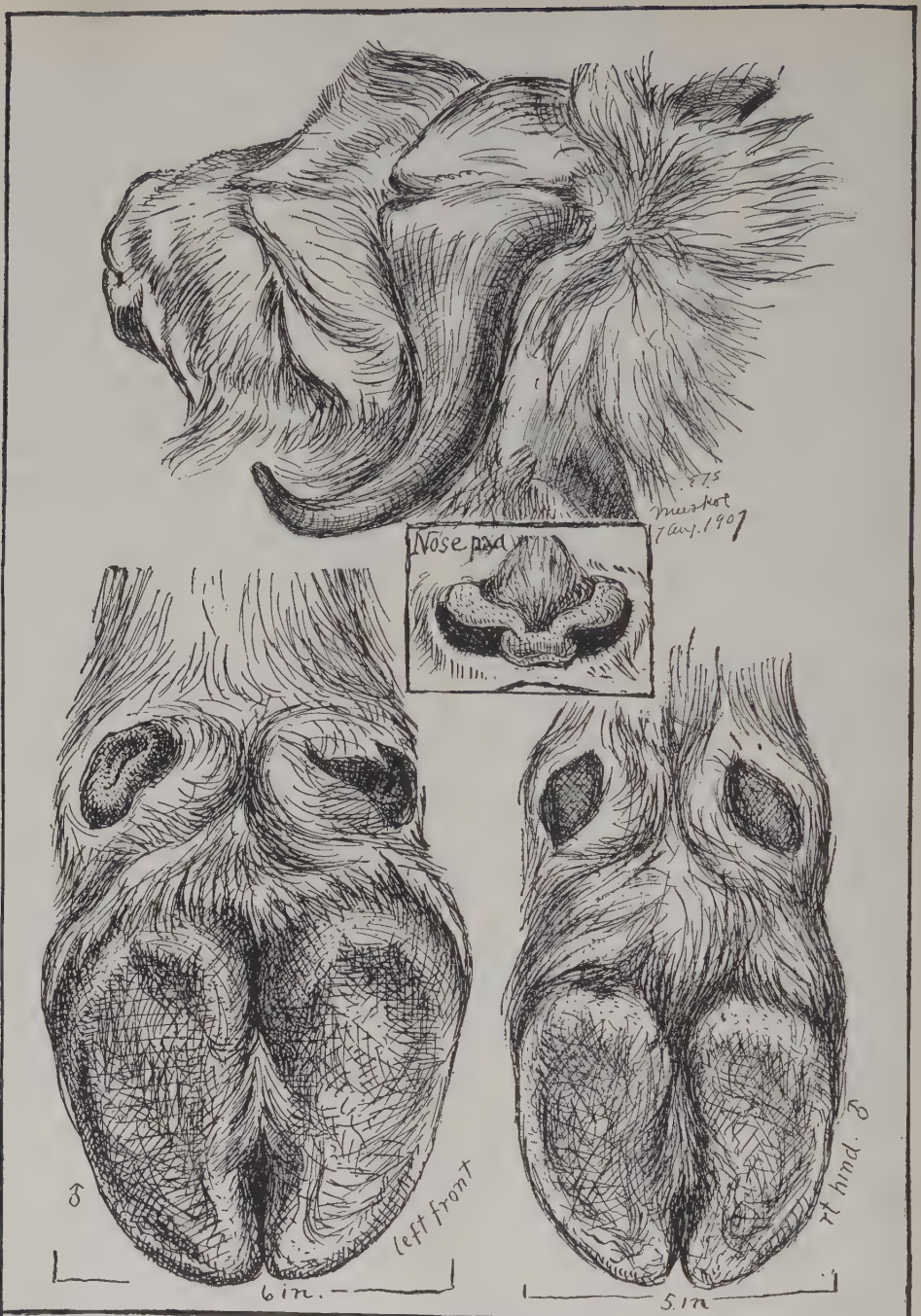

Plate LXXXV. – Details of bull Muskox
by E. T. Seton, 17 August, 1907

save for one tip that was sawn off with a very blunt instrument. The operator began sawing off the terminal half of the other horn, but fortunately did not finish.[35]

Dr. R. M. Anderson contributes the following notes to Allen's Monograph:

"*Herschel Island.* In August, 1908, Mr. Stefansson and myself found an old Muskox skull on the southwest sandspit of Herschel Island, Yukon Territory, Canada. It seems hardly probable that this skull was brought from the Franklin Bay region by whaling ships, both on account of its weathered appearance and the fact that the harbour for ships is at the other end of the Island.

"*Arctic Coast of Alaska.* June 24, 1909. Found part of an old Muskox skull (frontal bones, base of skulls and part of each horn core), water logged and green with moss, half buried in the mud of a beach, about 3 feet from the bank, near the mouth of a little creek about 2 miles west of the western mouth of Colville River, Alaska.

"June 2, 1909. Muskox remains were found in Colville River Valley.

"Panniyulak, one of the older and most prominent men in the Colville region (Alaska), told us that there is a Muskox skull in a good state of preservation on the west side of Kupuk Island, Colville Delta, about 5 miles below the mouth of the Stkillik River (the largest eastern affluent of the Colville, near its mouth). This skull was also known to other natives in this village. None of the men here, the oldest probably 60 years of age, have ever seen a living Muskox, although all have seen skulls and bones at various places on the level country (coastal plain) but none in the mountains."[36]

Anderson sends me the new record of part of a skull found by Dr. E. DeK. Leffingwell in a low bank of frozen muck, Camden Bay, 10 miles east of Collinson Point, Alaska.[37]

Thus we are bound to believe that 100 years ago, the Muskox was found on the main Barrens of Alaska and Yukon; that is, the Arctic region west of the Mackenzie. But it could not have been numerous or some of the white explorers would have run across it, or seen its robes among the natives. Probably the last were killed about 1850—certainly before 1865.

Historic Range Southward

The earliest account of the Muskox with information on its range is that of Jérémie, about 1700, as already cited in the historical chapter. The

[35]W. T. Hornaday, N. Y. Zool. Soc. Bull., Jan., 1917, p. 1445; photos.

[36]R. M. Anderson, in Muskox Monog., p. 186.

[37]Personal letter, April 23, 1926.

next important testimony in fixing the recent southern range of the Muskox in Canada, is that of Samuel Hearne, who set out on foot from Prince of Wales Fort (Churchill). On June 23, 1770 (being between Seal and Kazan rivers), he saw and shot 3 Muskoxen.[38] On July 17th, when not far from Yath-Kyed Lake, he "saw many Muskoxen, several of which the Indians killed."[39]

Later, in referring to this part of his journey, he says: "We saw a great number of them . . . before I had got an hundred miles from the Factory [Pr. of Wales Fort], and indeed I once perceived the tracks of 2 of those animals within 9 miles of Prince of Wales's Fort."[40] This shows that, at that time, they were still found in the region down to the edge of the forest.

The southmost record at hand is well within the forest belt; and is given by E. A. Preble as follows:

"Through the kindness of Dr. Alexander Milne, of York Factory, I obtained what is probably the most southern authentic record of the occurrence of this animal. Several times during the summer of 1897, parties of Indians reported seeing a pair of Muskoxen on the 'Barrens' about halfway between York Factory and Fort Churchill. The male was finally killed in August, and the head was brought by the Indians to York Factory. This pair had probably wandered beyond the limits of their normal range during the preceding winter; and for some reason, failed to return northward."[41]

Throughout the country traversed in his journey northwestward to Coppermine River, Hearne found the Muskox abundant. That is, he encountered them as soon as he entered the treeless region, the prairies of the North; and saw them in abundance in every part that he visited.

But there are many winter harbours for whalers' boats in the adjoining parts of Hudson Bay; and it is the custom of their folk to send out parties to find the Muskox, and kill all they find. We have few records, but the following seem to prove that Muskox are no longer found south of lat. 65° in this, their principal range.

J. W. Tyrrell travelled with his exploring party from the east end of Lake Athabaska down the Telzoa or Doobaunt River to Chesterfield Inlet on Aug. 18, 1893, and saw no Muskox, or sign of them, till at 6 miles north of Doobaunt Lake, lat. 64°.[42]

[38]Journey, p. 31.
[39]As above, p. 38.
[40]As above, p. 135.
[41]N. A. F., 22, 1902, p. 44.
[42]Sub-Arctics, p. 104.

Hanbury writes on Aug. 8, 1901: "After ascending the main Ark-i-linik River for about 35 miles [that is above its junction with the Doobaunt], Muskox tracks commenced to get very numerous. The muddy shores in places were so ploughed up with them as to give the idea that a drove of Cattle had passed along.

"On Aug. 9, our eyes were gladdened by the sight of a band of Musk-oxen, numbering 18."[43]

In 1907, I explored for 15 miles north of Aylmer Lake, and found only one Muskox and few signs. In this region, 10 years before that (1898), Buffalo Jones had found them common.[44]

Capt. Geo. Comer writes in 1912: "They range along the coast of Hudson Bay from Chesterfield Inlet to Repulse Bay. . . . They are not found, however, on Melville Peninsula nor in Baffin Land, and the natives of the present day have no remembrance of their ever having been there. I do not think they are found south of Chesterfield Inlet or Baker Lake. They are quite numerous west and northwest of Wager Inlet. Last winter (1911–12) 40 were taken by the Eskimos. I was unable to get their skins as they were held for the Hudson's Bay Company. It is from this locality that I obtained the specimens for the Field Museum in 1896, and for the American Museum in 1902."[45]

In the great triangle which lies south of Chesterfield Inlet, therefore, the Muskox was abundant in Hearne's time, 1774, and is wholly wanting to-day. The extermination was almost certainly accomplished by whalers in the middle of the 19th Century.

Between the Mackenzie and Coppermine Rivers

Here the extermination was almost completed during the first few years of the present century. Dr. R. M. Anderson's notes, published by Allen,[46] include the following passages:

"*Liverpool Bay.*—April 14, 1910. While camping in the south west part of Liverpool Bay, Memoranna (Jimmy), one of the most trustworthy Eskimos of this region, about 35 or 40 years old, told me that formerly Muskoxen were often killed on the west side of Liverpool Bay, and that he had seen 2 here when he was a boy. Since that time (probably 25 years ago) none had been heard of west of Cape Bathurst.

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[43]Northland, pp. 11–12.
[44]Buff. Jones, 1899, p. 371.
[45]Muskox Monog., p. 191.
[46]As above, pp. 186–87.

"*Extinction in region around Franklin Bay.*—I have information from numbers of whalers, as well as natives of the region, that Muskoxen were frequent around Langton Bay, and in the highlands on the west side of Franklin Bay as far north as the mouth of Horton River, as late as 1897. During 1897–98, 4 ships wintered at Langton Bay, and over 80 Muskoxen were killed, mainly by Alaskan Eskimos hunting for the ships. Some of the meat was hauled to the ships, but the bulk of the animals were killed too far away for the meat to be hauled in, and most of the robes were left out too long in the spring thaws, so that very little use was made of anything. Since that time, no traces of living Muskoxen have been seen in the region, either by natives who occasionally hunt there, or by our party during over 2 years. Muskox heads, horns, and bones are occasionally found on the ground.

"The same winter that the ships were at Langton Bay, Akpellik (an Alaskan Eskimo) killed a herd of about 20 Muskoxen near the coast, about the middle of the east side of Darnley Bay, near the base of a small range of conspicuous rocky hills.

"*Last record of Muskoxen seen by western Eskimo.*—Somewhere between the years 1898 and 1905, 4 Alaskan Eskimo hunters made a long expedition after Muskoxen. Ascending a fairly large river which enters the east side of Darnley Bay, they travelled inland (southeast) for 9 days before seeing Muskoxen, and finally killed 27 in 2 bands. These skins with some heads were sold to whalers at Baillee Island. Coming out, they travelled north 6 days before they struck the Arctic coast, $4\frac{1}{2}$ days east of Cape Lyon. From the circumstances of their account, it is practically certain that these hunters went as far east as the lake which is the source of Rae River. The Rae River Eskimos, at the western end of Coronation Gulf, from Mr. Stefansson's account, know little about the range of the Muskox, and many had never seen the animal. It is probable that a few Muskoxen may still be found in the high, rocky uplands at about the centre of the triangle bounded by Darnley Bay, Coronation Gulf and Great Bear Lake.

"In our winter traverse from Langton Bay to Great Bear Lake, on January 5, 1911, we saw old tracks and dung on the snow which were declared by the Slavey Indians in our party to be those of Muskoxen. This was on barrens 40–50 miles northwest of Dease Bay, Great Bear Lake."[47]

According to Dr. J. A. Allen's map, there was still a small band of Muskoxen surviving northwest of Great Bear Lake in 1913.

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[47]Musk. Monog., p. 186.

Muskox at Great Bear Lake. David T. Hanbury describes the killing of 2 bulls in Aug., 1902, in the sparsely timbered country between Dismal Lake and Dease River.[48]

"We spent the greater part of the winter of 1910–11 on the east branch of Dease River and eastern end of the Great Bear Lake, and saw no recent signs of Muskoxen. Two or three years before, the Bear Lake (Slavey) Indians had made a big hunt in this region and killed about 80. During the winter we were there, the Indians had made an unsuccessful hunt to the northeast of Great Bear Lake, seeing no signs; but later in the winter (February or March, 1911) had seen 3 on 'Caribou Point' (the great Peninsula between Dease Bay and McTavish Bay, Great Bear Lake), and had killed all three.[49]

"*Dease River, N. W. T.*—In the summer of 1910, Mr. Stefansson and his Eskimos found numerous Muskox droppings of the previous winter around the Lake Immaernirk, the head of Dease River. None were seen the following winter, however.[50]

"*West end of Coronation Bay.*—Apparently Muskoxen are seldom if ever, found at the present time in the region around the mouths of Rae River, Richardson River or the Coppermine River. Quite a number of groups of Eskimos hunt in this region and they say that Muskoxen are all farther to the east.[51]

"*Coronation Gulf.*—Eskimos in a village about midway between Home Island and Epworth Point, Coronation Gulf, told us (April 15, 1911) that there are many Muskoxen on the mainland around a river called Kogyuktuayuk (about at the Tree River of charts, some 75 miles east of the mouth of the Coppermine River).

"They said they often see Muskoxen near the seacoast, but seldom hunt them, because they have only bows and arrows, and are afraid. These people had heard of people to the eastward (near Kent Peninsula) who have guns, and kill many Muskoxen.

"Eskimos from the country west of Kent Peninsula came to the schooner *Teddy Bear*, near the mouth of Coppermine River, in the spring of 1911, bringing about 30 Muskoxen skins with them.

"May 31, 1911, while hunting for traces of Muskoxen in the above mentioned region, we found several Eskimos who had been camping a few miles inland for some time, and these told us that they had seen no Musk-

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[48]Northland, pp, 225–234.
[49]R. M. A.
[50]As above.
[51]As above.

oxen that spring. They say the Muskoxen keep pretty far inland in spring and in early summer, and come to the coast later in the season."[52]

Dr. R. M. Anderson writes me that during the winter of 1924–25, the Eskimos killed what was probably the last remnant of the Muskox west of the Coppermine River.[53]

On the Polar Islands

The map sets forth the main facts of distribution on the Polar Islands, but the following records are worthy of repetition here as "nail heads of the carpet."

Victoria Island. Dr. R. M. Anderson says: "From information which Mr. Stefansson received from numerous groups of Eskimos in Coronation Gulf, Dolphin and Union straits, and Prince Albert Sound, it seems probable that no Muskoxen at all are found in either the southern or central portions of Victoria Island (i. e., Wollaston Land, Victoria Land, Prince Albert Land). Muskox horn implements among these people are said to come from eastern Coronation Gulf, or the mainland south and east of this region.

"Some of the Eskimos of Prince Albert Sound remember of the former occurrence of the Muskox around Minto Inlet and Walker Bay, but say that there are now none in that region. These natives say that up to 15 or 20 years ago, they occasionally made hunting trips across to the north side of Victoria Island (Collinson Inlet) and found Muskox there. It is their belief that Muskox are still found near the north coast of the island.

Banks Island. "I have talked with a reliable Eskimo (Kotzebue Sound, Alaska), who was with us 4 years, concerning Muskoxen in Banks Land. He had gone ashore one day several years before, near Cape Kellett (west side of Banks Land) to try to kill Caribou for a whaling ship, and saw numbers of Muskox skulls on the land. Eskimos who winter on the ice between Cape Collinson and De Salis Bay, say that the Muskox sometimes come down to the coast in winter."[54] There can be little doubt that the Muskox of Banks Island have been extirpated by the Eskimo themselves sometime between 1850 and 1870.

Melville Island. Capt. W. E. Parry's visit to Melville Island is full of interest to the naturalist. Reindeer and Muskox were frequently seen. On p. 78 he says: "We saw to-day for the first time a herd of 8 or 9 animals, feeding near the beach, which from their dark colour, we supposed to be

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[52]R. M. A.

[53]Personal letter, April 23, 1926.

[54]R. M. Anderson, in Muskox Monog., p. 187.

Muskoxen." The records of the voyage show that the Muskox were found in considerable numbers on the island.[55]

According to Frank C. Hennessey, "Muskoxen were abundant on Melville Island" (winter 1908–09).[56]

In Grant Land, 1881, A. W. Greely found the Muskox abundant whereever there were grassy valleys. He records it chiefly from the east coast, and mentions Ft. Conger, lat. 82°, long. 65°; Muskox Valley, lat. 81½°, long. 70°, where it was abundant; and Cape Sabine, lat. 78° 50,′ long. 75°, where he found traces.[57]

Parry, describing the Eskimos of Clyde River about lat. 70° west coast of Baffin's Bay on Baffin's Land as spotted on the map, says:

"They call the Bear *Nennook;* the Deer *Tooktook;* and the Hare *Ookalik;* being nearly the same words as those used on the eastern coast of Baffin's Bay. As it was considered a matter of some interest to ascertain whether they were acquainted with the Muskox, a drawing of that animal was put before the men who were on board. The small size of it seemed, at first sight, to confound them; but, as soon as a real head and horns were produced, they immediately recognized them, and eagerly repeated the word *Oomingmack*, which at once satisfied us that they knew the Muskox, and that this was the animal spoken of by the Esquimaux of Greenland, under the same name, somewhat differently pronounced."[58]

But, so far, there is not one definite, positive record for Baffin Island. Commenting on this, Capt. W. E. Parry says:

"It is a curious fact that the Muskox is very rarely found to extend his migrations to the eastward of a line passing through Repulse Bay, or about the meridian of 86° west, while, in a northern direction, we know that he travels as far as the 76th degree of latitude. In Greenland, this animal is known only by vague and exaggerated report; on the western coast of Baffin's Bay it has certainly been seen, though very rarely, by the present inhabitants; and the eldest person belonging to the Winter Island tribe had never seen one to the eastward of Eiwillik, where, as well as at Atkoolee, they are said to be numerous on the banks of fresh water lakes and streams. The few men who had been present at the killing of one of these creatures, seemed to pride themselves very much upon it. Toolooak, who was about 17 years of age, had never seen either the Muskox or the *kablee-arioo* [Wolverine], a proof that the latter, also, is not common in this corner of America."[59]

[55] Voy. Disc., pp. 254, 258, ff.
[56] Allen, Muskox Monog., 1913, p. 201.
[57] 3 Years, pp. 61, 417, 710, etc.
[58] Voy. Disc., pp. 286–87.
[59] 2d Voy., p. 512.

In Greenland

It is probable that every part of Greenland that has herbage, was pasture-land for the Muskox in primitive days. And that implies that all Greenland was stocked with Muskox in the recently past Warm Age that relieved that vast island of its icy cap. To-day, they are found along the narrow strip of grassland that begins on the west shore near the south part of Smith's Sound, and continues around the north shore and down the east shore to lat. 70°. The records affirming this are as follows:

"The observations of our parties extended the range of the Muskox (*Ovibos moschatus*) to the Greenland coast. None of us saw a living specimen; but the great number of skeletons, their state of preservation, and probable foot-tracks, when taken in conjunction with the information of the Eskimo, leave me no room to doubt but that these animals have been recent visitors."[60] The place indicated was about lat. 79°, long. 68°.

Brown, in his "Mammals of Greenland," p. 352, says that Dr. I. I. Hayes found at Chester Valley (lat. 78½° N.), on the east side of Smith's Sound, "among the Eskimo *kjoekken-moeddings*, the skull of a Muskox. Eskimo tradition describes the animal as at one time common along the whole coast; and they affirm that it is yet occasionally to be met with. No longer ago than in the winter of 1859, a hunter of Wolstenholme Sound [east side of Smith's Sound, lat. 76½°] near a place called Oomeak, came upon two animals, and killed one of them."[61]

At Independence Bay on the extreme northeast coast of the Island of Greenland, R. E. Peary found many Muskox signs, and shot 5 Muskox, July 4, 1892. This was about lat. 81°, 37′, long. 34° west.[62]

In 1895, near the same place, he saw a herd of 22.[63]

H. W. Feilden says: "We have heard of it from Polaris Bay on the northwest side of Greenland from about 81° N to Independence Bay on the northeast coast in about the same latitude; and from there, as far south as rhe 70th parallel. On the east coast of Greenland, the range of the Muskox is on a line drawn over the map from north to south embracing at least 700 geographical miles."[64]

On the east coast of Greenland, it is found down to 70½° N., i.e., Jameson's Land, according to Lieut. C. Ryder. He says: "Jameson's Land abounds in game. The Caribou and the Muskox are found in herds,

[60]Kane, Arc. Expl., p. 456.

[61]Hayes, Voy. Nor. Pole, 1866, p. 390.

[62]Northward, I, pp. 337, etc.

[63]As above, II, p. 476.

[64]Distrib. of Muskox in Greenland, Zoologist, Ser. 3, XIX, Feb. 4, 1895, pp. 1–44.

besides Bears, Foxes, Hares, and Lemmings. There are also a quantity of Birds."[65]

C. H. Ostenfeld says of the animals of North Greenland: "Among the herbivores, the Muskox is the foremost. The expedition depended chiefly upon this animal for its food, and it was mainly due to the fact that the Muskox was found only occasionally on the north coast, and in a considerable number only in one place (in one fjord), that men and Dogs suffered so much from hunger. Why the Muskox preferred this one place, we do not know. The vegetation was no more vigorous in the Muskox fjord than in other places; but in the whole district, it was so sparse that probably the limit of what a Muskox can be content with had been reached.

"This is indicated by the fact that the expedition did not meet with any calves."[66]

Haunts

The vast literature on the Muskox makes it possible to give exact details of its chosen home range. Primarily, it is an animal of the open, grassy, or scrubby plains of Canada, from the north edge of the woods to the sea. Its favourite food is grass; and favourite range the Northern prairies, on mainland or on Polar Islands, as far north as man has gone, that is, as far as there is land that is without an ice-cap in summer, and that, therefore, can grow grass.

Often, the whaler or explorer coasting along the rugged boulder-strewn hills, sees the dark brown form of Muskoxen mixed with the huge round erratics of a bygone ice-day; and, when alarmed, the Muskox scampers up steep hills and over rocks at a rate that leaves men far behind. For they are surefooted as Goats, and far more active than common Cattle.

"The Barren Ground, which they inhabit," says Russell, "is a vast area of rugged hills; most of them are boulder-strewn, with mosses, lichens, and occasional plots of short grass on slopes that have not been denuded of soil; in places, high, rolling hills of gravel occur. We invariably found the Muskox among the boulders at the summits of the highest hills. These rocks afforded but partial concealment, however, as the colour of the Muskox is too dark to assimilate readily with its surroundings at any season. They probably frequented the hilltops because the high winds, which prevail in that region, sweep away the snow, enabling the animals to graze with little digging."[67]

Sometimes, the Muskox at the south edge of its range strays into the

[65] Den Ostgrönlandske Expedition, 1891–92, pub. in Meddelelser om Grönland, 1895, p. 368.

[66] Rasmussen's Greenland, p. 298.

[67] Far North, p. 233.

wooded belt. Oftentimes, it has been seen wandering for miles into the scattering spruce, and less often, its huge Buffalo-like form is seen plunging and browsing among the willow thickets that line some of our northward-flowing streams.

Hanbury found them in the scrubby spruce woods along Arkilinik or Thelon River, Aug. 12, 1901.[68]

Roderick MacFarlane says that "during the severe cold of winter, the Muskox enters the outer sections of the forest, and is frequently found therein to a distance of 40 or 50 miles, while we have heard of more than one instance, where a stray animal had been killed at fully 100 miles from the nearest Barrens."[69] These, like the pair recorded by Preble, from near Fort York, were mere stragglers.

Not often or far does it go, into dense swampy lands; and rugged mountains do not hold its affection for long; but it enjoys them for a season, and quits them only to drift to its proper home—the wide lush grassy plains, the prairies of the North.

As one ponders this account, the thought recurs: Does not every word of this apply to the Buffalo on its primeval range? Is not, indeed, the Muskox simply a Bison, a prairie Buffalo, environed in the North, and done into terms of polar surroundings?

Numbers, Ancient and Modern

When one spreads out the Buffalo range on the plains for Anno Domini 1800, and the Muskox range for the same date, one is amazed to find that the Musk-Buffalo had at that time a dispersal about as wide as that of the Plains Buffalo. On the map, its range is about 2,000 x 3,000 miles. But there could have been no comparison between the numbers. The 50,000,000 of Plains Buffalo were probably contemporaneous with less than 1,000,000 Muskoxen.

The palmy days of the species, when it covered all Eurasia down to the latitude of London, and all America down to the latitude of Philadelphia, were long gone by, and now our information is based on fragmentary records and fleeting glimpses in sundry historic pages.

Ever to the front in matters of Northern travel and animal life is good old Samuel Hearne. On his famous journey across the Northern plains, when he got to a place which, according to his map, was lat. 69° N., long. 120° W.—that is, in the Coppermine River region, 150 miles south of that river's mouth—he found a lake of which he says:

[68]Northland, p. 39.

[69]Mack. Basin., pp. 172–73.

"This lake I distinguished by the name of Buffalo or Muskox Lake, from the number of those animals that we found grazing on the margin of it; many of which the Indians killed, but finding them lean, only took some of the bulls' hides for shoe-soals. . . .

"It has been observed that we saw a great number of them in my first unsuccessful attempt, before I had got an hundred miles from the Factory. . . . Great numbers of them also were met with in my second journey to the North; several of which my companions killed, particularly on the 17th of July, 1770. They are also found at times in considerable numbers near the sea-coast of Hudson's Bay, all the way from Knapp's Bay [120 miles north of Churchill] to Wager Water, but are most plentiful within the Arctic Circle. In those high latitudes I have frequently seen many herds of them in the course of a day's walk, and some of those herds did not contain less than 80 or 100 heads."[70]

During the year that Parry spent on Melville Island, 1819–20, his party secured 3 Muskox, 24 Caribou and 68 Hares.[71]

M'Dougall says that on Melville Island, "about this time [early summer] Muskoxen, Deer, Geese, Ducks and Ptarmigan were seen in great abundance."[72]

Lieut. George F. Mecham, who was with him, went on a side trip to Hardy Bay, Melville Island and reports: "Muskoxen were here in very great numbers. On one plain, I observed as many as 70, grazing within a circuit of 2 miles."[73]

M'Dougall seems to have hunted harder or had more luck, for his game list for about a year on Melville Island is as follows: "3 Sept., 1852, to 9 Sept., 1853—Muskoxen, 114; Reindeer, 95; Hares, 146; Bears, 6; Wolves, 3; Foxes, 51."[74]

Capt. F. L. M'Clintock, in 1857–59, killed 89 Muskox on Melville Island, and 5 on Prince Patrick Island.[75]

"In Melville Island, 10 or 15 animals make up a typical herd, and I have never seen more than 40 in a herd, strictly speaking, although I have seen over 100 scattered over a few square miles of flat land in such a way that one might take them for a single herd."[76]

As one follows the accounts of Warburton Pike, Buffalo Jones, Caspar

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[70]Journey, pp. 135–36.
[71]Voy. Disc., p. 257.
[72]Resolute, p. 275.
[73]Resolute, p. 289.
[74]Resolute, App., p. 529.
[75]Nat. Hist., etc., Greenland, etc., by T. Rupert Jones, 1875, p. 498.
[76]Stefansson, Friendly Arctic, p. 586.

Whitney, A. W. Greely, R. E. Peary, and others of Northern fame, one realizes that they had to go many miles over the Barrens to find a Muskox, and then it was a herd of a dozen or more individuals, never more than a score. Even in Hearne's time, 80 or 100 was a "great herd." And as soon as this herd was killed off,—as was easily done with Dogs and rifles,—there were no more Muskoxen in that region. The entire population for maybe a day's journey—25 miles each way—was there assembled, and permanently wiped out. For their rate of increase was very slow; indeed, the species was barely holding its own against its natural foes.

Storker T. Storkerson, of the Canadian-Arctic Expedition, 1913–18, testified before the Canadian Royal Commission, May 20, 1919, that he estimated the Muskox on Melville Island in 1917 at 4,000; "of which, he and his party killed 400 for food." (Reindeer and Muskox, p. 14.) Melville Island is about 20,000 square miles in extent; that is, about the size of Nova Scotia.

These facts help us to form an idea of the original numbers of the Muskoxen. They were never to be compared with those of the Buffalo. I suspect that never since the discovery of America, were there as many as 1,000,000; and, with a total accredited present range of about 1,000,000 square miles, it is doubtful if 50,000 Muskoxen are left alive to-day.

Possibility of Restoration

In this glum tale of woe, it is pleasant to find one reassuring note; to learn that, given relief from the toll of human slaughter, the Muskox may recover, in some degree, its range and its numbers. Doctor Allen says:[77] "It is of interest to note that, while the Muskox in Greenland has been exterminated within the last 75 years, from the southern part of its former range on the west coast, it has, within about the same length of time, extended its range southward along the east coast, having been found as far south as Scoresby's Sound, in about lat. 70°. A. G. Nathorst, in 1899, found numerous herds, where in 1822, the Scoresbys, father and son, found none, although they made considerable journeys into the interior.[78]

"The following year, Sabine found no Muskoxen at Sabine Island some 4 degrees farther north, where he spent 2 weeks, but where they have since been found in abundance. Hence, it appears that the animal extended its range southward in the course of 70 or 80 years, from lat. 75° to lat. 70°, due, it is thought, to the extinction of the Eskimos, along this part of the coast during this interval."

[77]Muskox Monog., p. 162.

[78]H. Conwentz, 1900, pp. 427–32.

PLATE XCV.—LIFE STUDIES BY E. T. SETON

1. Study of an old cow. 2. Young cow. 3. Buffalo cow (Jardin des Plantes, March 25, 1892) 4. Old cow

PLATE XCVI.—BUFFALO BULL TEARING UP THE GROUND

The first act in wallowing

From a photograph by R. L. Walker, of Carnegie, Pennsylvania

PLATE XCVII.—A VERY HIGH-HUMPED OLD BULL

PLATE XCVIII.—THE OLD BULL'S LAST FIGHT

Drawings by E. T. Seton

Non-migratory

Most migrations are the result of food shortage induced by winters with deep snow. To this rule, the Muskox is an amazing exception.

In spite of much early misinformation, we know now that the Muskox is absolutely non-migratory. Even in its farthest north range, where winter is dark, hard, and long, and the snowfall overwhelming, the Muskox lives his hardy life unmoved by blizzards, fearless of Bears and Wolves; of every creature and hazard, native to its home, quite unafraid.

The first, I believe, to question the migratory theory was Dr. A. Fisher, 1819. "At the foot of a hill," says he, "where we saw these Muskoxen today, and along a plain that lay between it and the sea, we passed so many skulls and skeletons of Muskoxen, that I am inclined to alter my opinion respecting their migrating to the coast of America during the winter; for if they only visit this country in the summer time, it is somewhat strange that so many should die here during such a favourable part of the year. Besides, they are so well provided by nature for enduring the rigour of the climate, that the necessity for their leaving this island does not appear to be altogether so indispensable, as a person would at first sight be inclined to believe. This, however, is a subject on which much might be said for or against the question; but as I am not particularly interested on my own part, to establish the point, whether they migrate or remain here, I shall forbear saying any more about the matter, any further than that we know that Wolves and Foxes pass the winter here, and neither of them appear to be better provided for withstanding the cold than the Muskox; and with respect to food, there is certainly much more grass in the valleys in this vicinity, than they will destroy this season."[79]

One of the earliest positive paragraphs on this is from the pen of General Greely.

"Just before going into camp," he says, "Sergeant Brainard discovered on that winter's snow the dung of a Muskox, which he thought could be scarcely a week dropped. He well says: 'This should be positive proof that the animal does not migrate south with the sun and return the following year as the sun advances, as many assume to be his habit; but remains in some well-sheltered valley or ravine during the winter darkness, subsisting on whatever comes in his way.' This incident, and my personal experience, as well as that of the British expedition, leaves no doubt that the Muskox is a regular habitant of Grinnell Land and Northern Greenland the entire year."[80]

[79] Voy. Disc., pp. 258–59.

[80] 3 Years, p. 177.

"They certainly do not migrate," says Frank C. Hennessey. "I am sure of this, not only because we found them there throughout the winter, but also for this reason: If they did migrate, it would be to the northern shore of the continent (which is just as inhospitable as where they live now), and Melville Sound is open sometimes for more than three fourths of the year, and it is open during the worst months of the year, the blizzard keeping it open.[81]

In Greely's illuminating account already cited, is a remark which is full of significance. His party was travelling westerly over Grinnell Land, or more properly, Ellesmere Island. When near Mt. Arthur, lat. 81° 20′, long. 75°, A. W. Greely wrote: "Two hours travel carried us beyond the last snow; where tracks and traces of Musk-cattle were observed, one calf being among the number; and near-by the first live willows were seen. This proves that the Muskox crosses at times to the western shore of Grinnell Land, even if he has not migrated to Greenland from the Parry Islands by way of the western instead of the southern shores of Grinnell Land."[82]

So entirely stamped out is the instinct to migrate, that Hanbury makes the following comment:

"When Muskoxen get away into a quiet, secluded little place, it is extremely difficult to find them. This bull had been here the whole summer, and had not strayed half a mile."[83]

Food

Early writers of natural history are responsible for the idea that the Muskox lives on moss and lichens chiefly. This notion was born of the belief that these low forms constituted the entire vegetation of the Northland. We know now that there is abundance of grass in many localities throughout the region; and that grass is the staple food of the Muskox, though it will vary this diet with willow browse, various creeping plants, and occasionally, moss and rock-lichens.

Hearne says: "They will feed on anything; though they seem fondest of grass, yet in Winter, when that article cannot be had in sufficient quantity, they will eat moss, or any other herbage they can find, as also the tops of willows and the tender branches of the pine tree."[84]

Capt. W. E. Parry thus describes the summer feeding range of the Muskox as he saw it, Friday, Aug. 25, 1820: "Immediately under the

[81] Muskox Monog., p. 201.
[82] 3 Years, p. 359.
[83] Northland, p. 225.
[84] Journey, p. 136.

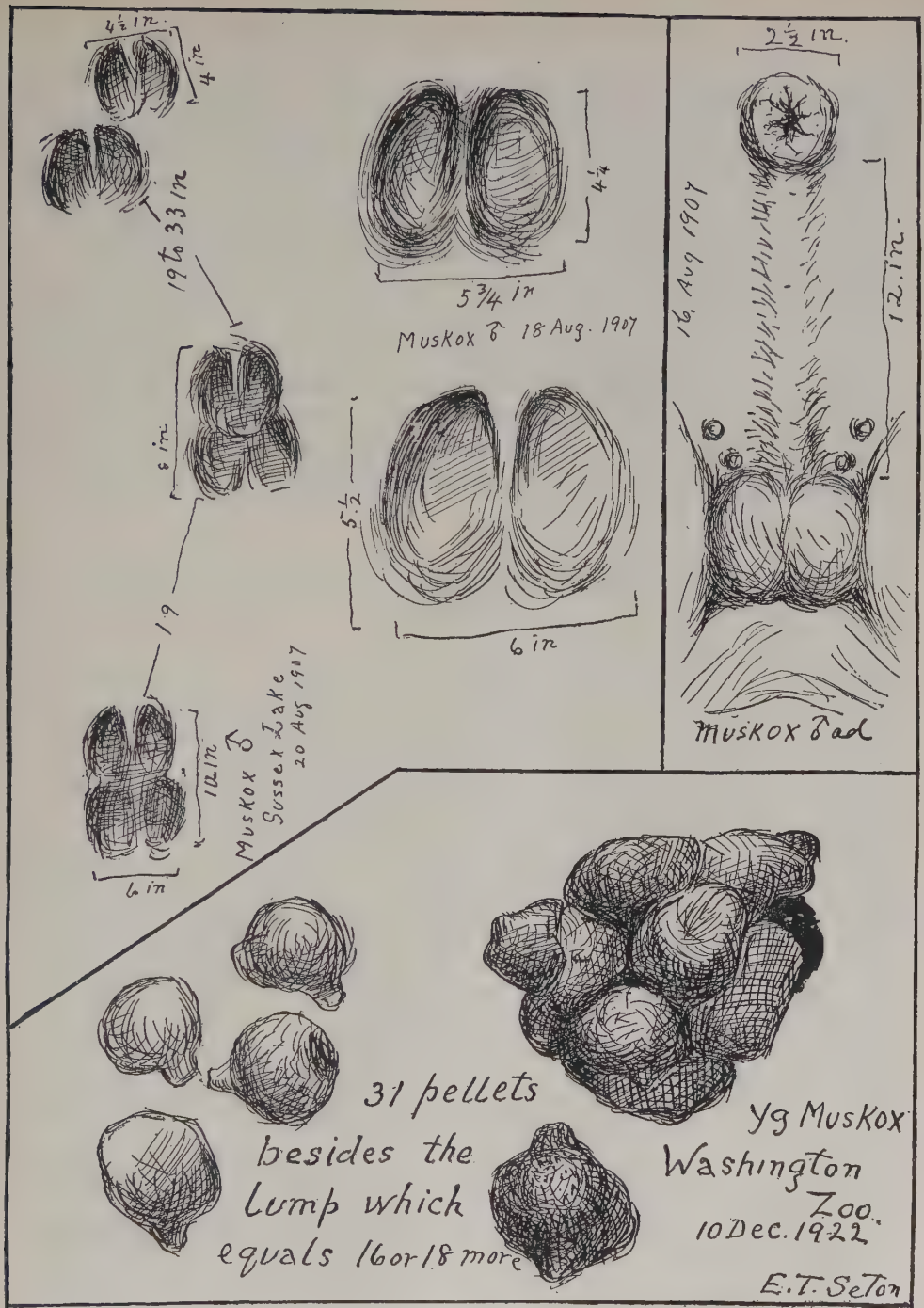

Plate LXXXVII. Muskox details

hills, which here, for the first time, in sailing from Cape Providence to the eastward, recede about two miles from the sea, was the most luxuriant pasture-ground we had yet met with on Melville Island. It consisted of about a dozen acres of short, thick grass, intermixed with moss, which gave it almost the same lively appearance as that of an English meadow. It was covered with the dung and foot-tracks of Muskoxen, of which 12 or 14 skulls were picked up near it; and it was here that the herd before mentioned was feeding."[85]

One of the best accounts of its food is given by Greely as follows: "On my way across the low divide which separated the two bays [Basil Norris Bay and Sun Bay, northeast Grinnell Land], I was fortunate enough to find 2 Muskoxen; and by taking advantage of the ground, succeeded in approaching within 40 yards of them without attracting their attention.

. . . . . .

"The circumstances were such as afforded me an excellent opportunity of observing the manner in which these animals obtain their food in winter, as they were feeding while the ground was covered with snow sufficiently deep to conceal the scanty vegetation of the valley. Moving from one patch of *Dryas* or *Saxifrage* to another, the animal with its hoof scraped away carefully the snow from the plants, and later supplemented this action by the further use of horns or proboscis, as circumstances or convenience dictated. In no case did either animal fail to first remove the bulk of the snow with its hoof.

"Their food at this time was almost entirely *Dryas octopetala* and *Saxifraga oppositifolia;* the grasses and lichens were almost entirely lacking, and in no case did I ever note a Muskox feeding on the latter vegetation, although in many places near Conger the ground was covered with scanty, minute lichens for acres in extent."[86]

Major Feilden says:[87] "Leaves and stems of willow with grasses, were in the stomachs I examined."

Hanbury killed a big bull on Dease River, Aug. 7, 1902, whose "paunch contained nothing but willows."[88]

And C. H. Ostenfeld says of the Muskox at the extreme north of Greenland:

"Wulff examined several stomachs of Muskoxen, and always found

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[85]Voy. Disc., p. 258.
[86] 3 Years, pp. 84–85.
[87] Zoologist, Vol. I, 3d series, p. 358.
[88]Northland, p. 225.

them filled with twigs of willow and, to a less degree, with leaves of anemone and other plants."[89]

The following notes on the cow Muskox in the N. Y. Zoological Park, give light on the creature's food habits, that may be of service to those who have to handle these animals in future:

The calf Muskox secured by Capt. H. H. Bodfish between Great Bear Lake and the coast, in March, 1901, was a female about one year old. She was successfully kept "on willow twigs and coarse grass from the Barren-Grounds, and finally brought to San Francisco. As soon as civilized hay became procurable, she began to eat it with relish, and her former diet of willow twigs was forever discontinued." She arrived at the N. Y. Zoological Park, March 12, 1902, when 22 months old, where she now is apparently comfortable, and in perfect health.

"Her food consists of clover hay, crushed oats, green vegetables and fresh grass from which green clover is carefully excluded. She has browsed down nearly all the bushes that originally grew in her enclosure."[90]

Good Fellowship

Of all the animals treated in this work with the exception of the Plains Buffalo, the Muskox is the most gregarious.

Frank C. Hennessey, writing to Dr. J. A. Allen, says of the Muskox, which were abundant yet on Melville Island: "During the winter, the animals always herd. It is likely that some outcasts go about singly, but we saw not one of these. The smallest herd we saw during the winter was 4 and the largest 40."[91]

Throughout springtime, the various explorers have always found them in bands of both sexes.

Russell writes: "There are usually 20 or 30 in a band; but they sometimes assemble in herds containing over 100. . . . In one band of 11 which we killed, there were 8 males; in another, in which 25 were killed, there were only 2 females; and from this herd I shot 4 bulls which broke away from the Dogs together; all were of the largest size and evidently quite old."[92]

Similarly Dr. A. Fisher: Aug. 24th "we observed a herd of 7 Muskoxen at the foot of a hill, at the distance of about 2 miles from the beach. . . . We succeeded in getting one of them, which was a bull, and apparently the

[89]Rasmussen's Greenland, p. 298.
[90]N. Y. Zool. Soc. Bull., Sept., 1902, p. 34.
[91]Muskox Monog., p. 201.
[92]Far North, p. 233.

largest in the herd. Among those that got away there were 2 calves, and all the rest, with the exception of one, appeared to be cows. In the course of the evening, another Musk-bull was shot, which was found by itself, and therefore supposed not to be one of the herd just mentioned."[93]

During the early summer, as with so many bovines, there is a disposition to break up the herds. Especially do the bulls seem to go where they can think things over by themselves "far from the madding crowd."

"Towards the coming of summer," says Hennessey, "the herds always break up, and I noted the bulls wandering aimlessly about the sea coast. Between the time when the ice and snow had left the greater part of the land and the time of our departure, we saw at Windsor Harbour (Melville Island) only one cow, the rest being solitary bulls. This may have been an accidental occurrence, but it is certainly interesting, for it leads me to think that perhaps during the season of propagation the cows remain inland."[94]

This summer solitude of the bulls seems to be the only exception to their rule of habitual gregariousness. The only Muskox I ever saw wild was a solitary bull Aug. 16, 1907. He had wandered for 10 or 15 miles at least; and so far as I could learn from his tracks, was quite alone in the country.

The Harem

August is the mating season. Then there is a reuniting of the bands. So say many recorders, including Hearne. This sturdy old traveller continues:

"The number of bulls is very few in proportion to the cows; for it is rare to see more than 2 or 3 full-grown bulls with the largest herds; and from the number of the males that are found dead, the Indians are of the opinion that they kill each other in contending for the females. In the rutting season they are so jealous of the cows, that they run at either man or beast who offers to approach them; and have been observed to run and bellow even at ravens, and other large birds, which chanced to light near them."[95]

The solitary bulls at this season may be those that were defeated in the fight for mates; or possibly their cows had ceased to be interesting, and they were in search of new possibilities.

The spring of the year finds the Musk-cattle in bands of both sexes, as usual. It is not known whether or not the mothers go off alone to produce their young.

[93] Voy. Disc., pp. 257–58.
[94] Muskox Monog., p. 201.
[95] Journey, p. 136.

At Muskox Valley, Grant Land, Ellesmere Id., May 3d, Greely killed a cow Muskox nearly ready to deliver a calf.[96]

The Baby Muskox

According to Hearne, the young are born in "the latter end of May, or beginning of June; and they never have more than one at a time."[97]

The young one is a funny fuzzy little bump of black moss, like a magnified kid, tricked out in fluffy velours. According to some accounts, the little one is hidden by the mother in the moss, or the moss and snow; quite buried for one, two, or three days. She lingers near, and comes to nurse it at frequent intervals. Other travellers maintain that the young are able to follow the mother within an hour or two of birth, and are never left alone.

Analogy with the Plains Buffalo inclines one to accept the latter account. The growth of the young closely parallels that of the Plains Buffalo calf. Its mother is devoted and fearless in her care. And the frightened grunt or bleat of the calf is enough to rally the whole herd about it.

Of course, writers who tell about the herd in a perfect circle or a perfect square, with the calves in the middle, do not mean literally a circle or square. Impartially read, it would mean that the herd bunches, the calves get next the mothers, and the bulls face the enemy, and even advance on him, so that something like a definite formation is often achieved.

M'Dougall says, May 8, 1853: "During the afternoon, Mr. Dean returned with the carcases of the animals shot yesterday, also a young bull calf about 4 days old, which he had caught in the vicinity of the scene of yesterday's slaughter, when in all probability the mother had been shot. The little animal was about the size of a small lamb (height to foreshoulder, 19 inches; from nose to tail, 20 inches; weight, 25 lbs.), with a large head and prominent eyes. On its arrival on board, it could scarcely stand on its legs, but after partaking of a little warm milk, from a phial, the mouth being covered with chamois leather, it appeared to be thriving; and for a day or two, ran about the decks in such great glee as to induce us to hope we might be enabled to convey to England in safety this interesting specimen of an animal so little known as the Muskox. Unfortunately, however, its strength gradually decreased, and on the 4th or 5th day, it died."[98]

R. MacFarlane says that a Muskox calf which he "captured on the Barren Grounds east of Fort Anderson, in the summer of 1864, bellowed like

[96] 3 Years, p. 417.
[97] Journey, p. 136.
[98] Resolute, p. 244

a domestic calf, but with a stronger voice; and that in attacking its captors, it backed off, and butted like a ram."[99]

He further states that it gave endless trouble bucking and kicking like a Goat, stubbornly refusing to be led by a line.[100]

The story of Buffalo Jones's hunt after Muskox calves given in his "Adventures," affords vivid and intensely interesting picture of the ways and country of these untamable little woolbearers. Jones and his partner, Rae, had secured five lusty little calves, and meaning them for the nucleus of a Muskox ranch, brought them out nearly to the woods. But one sad morning, these two gallant explorers awoke to find the calves dead with their throats cut. The Indians believe that if one take out any live Muskox, all the rest will follow after them and be gone for ever. To prevent this calamity, they had sneaked in by night and killed the captives.

On Sept. 7, 1925, in the Bronx Zoological Park was born a baby Muskox, the first ever born in captivity in America. It stood 18 inches high at the shoulders, and weighed 16 pounds. On Sept. 14th, another arrived. Each lived but 4 days. Their mothers were $2\frac{1}{2}$ years old and had practically no milk. It is believed that next year, the calves will be saved.

The Grand Old Warrior

A herd of Muskox may stand at gaze, or run as fast as they can, when approached by men; but when approached by Dogs (or Wolves), they form a solid mass to face the enemy. This gives the riflemen a perfectly easy, unhazardous opportunity to shoot them all from a safe distance which method indeed, has been the established mode.

I do not know of any nobler spectacle in animal life than that of the ten-times trained and selected old King Bull of the harem, deliberately keeping himself between his many-wived household and its foes—marching around the frightened herd to reassure them of his absolute protection. Of his strength and power they are not in any doubt. Arctic explorers are little given to sentiment, and yet in their cold-blooded and carnivorous accounts, one cannot fail to find the under-note of admiration for this dauntless old warrior's valiant—usually hopeless—fight against irresistible odds and death.

The bull Wapiti, the bull Caribou, and the buck Whitetail are attached to their females only during the period of wild and propagational joy. At any other time, their wives can go hang, so far as the overlording husband is

[99]Preble, Athabaska-Mackenzie, p. 155.
[100]Mack. Basin, p. 171.

Bull Muskox
Horns: Length 30"; Width 13¼
Spread, 27. Coll.n E.W. Darbey

Plate, LXXXVIII. — Remarkable Muskox Head

concerned. In gladdening contrast to this is the demeanour of the Musk King-bull. Summer and winter, glad time or sad time, he is with the herd, and ready at all times to prove himself its fighting champion—its fearless and unselfish defender.

Lieut. George F. Mecham, of M'Dougall's party, when on Melville Island, wrote of the great herd of 70 head he saw at Hardy Bay in the early summer of 1820:

"On my approach, they divided into herds of about 15 each, headed by 2 or 3 enormous bulls. Their manœuvres were so quick and regular, that they were to be compared to squadrons of cavalry more than anything I could think of. One herd advanced several times at a gallop within rifle shot, and formed in perfect line, with bulls in front, showing a formidable front of horns. The last time they advanced at a gallop to about 60 yards, and formed in line, the bulls at the same time snorting and tearing up the snow.

"Immediately I fired they wheeled round, joined the main herd, and made off out of sight, only waiting occasionally for the wounded one."[101]

Frank Russell says: "I had an excellent opportunity to observe their behaviour on one occasion, when we approached within 30 yards of a dozen Muskox, held at bay by as many Dogs. They were in two groups about 20 feet apart, an old bull standing between them. They were not formed in a circle nor in two circles, but all turned toward any Dog which ventured too near, seldom lowering the head, but standing firmly, the head in line with the back. Two other herds, when pursued by the Dogs, scattered in all directions; they would run a few yards, then turn to dash at the Dogs as they closed in, repeating this performance until overtaken by the hunters to whom they fell an easy prey."[102]

Dr. John Richardson has described the behaviour of a herd that was approached by hunters without Dogs.

"On perceiving a herd of cows, under the presidency of an old bull, grazing quietly at a distance of a few miles from our bivouack, he [Dr. John Rae] and Albert crept toward them from its leeward; but the plain containing neither rock nor tree behind which they could shelter themselves, they were perceived by the bull before they could get within gunshot. The shaggy patriarch advanced before the cows, which threw themselves into a circular group, and, lowering his shot-proof forehead so as to cover his body, came slowly forward, stamping and pawing the ground with his fore feet, bellowing, and showing an evident disposition for fight, while he tainted the

[101] Resolute, p. 289.

[102] Far North, p. 235.

atmosphere with the strong musky odour of his body. Neither of the sportsmen were inclined to irritate their bold and formidable opponent by firing, as long as he offered no vital part to their aim; but, having screwed the bayonets to their fowling pieces, they advanced warily, relying on each other for support. The cows, in the meantime, beat a retreat, and the bull soon afterward turned; on which Mr. Rae fired, and hit him in the hind quarters. He instantly faced about, roared, struck the ground forcibly with his fore feet, and seemed to be hesitating whether to charge or not. Our sportsmen drew themselves up for the expected shock, and were by no means sorry when he again wheeled around, and was, in a few seconds, seen climbing a steep and snow-clad mountain-side, in the rear of his musky kine."[103]

What might have been the next chapter of this story is given by Dr. A. Fisher. Of course, the explorers needed meat, which justified whatever killing they did, and yet one must admire the bravery of the grand old leader—scorning to fly—fearlessly facing his foes to the end.

When first they saw the old bull, "he was going along the beach to the eastward; and, from the nature of the ground, was obliged to pass so close to us that he was fired at from the ship. We thought at first that he was wounded on this occasion; but we soon had reason to alter our opinion, for he galloped off at greater rate than an animal of his shape could be supposed capable of going. The nature of the ground was, however, as I have already remarked, very favourable for our purpose; for he was hemmed in by the sea on one side, and steep cliffs which he could not ascend, on the other. When he found, therefore, that he was assailed in such a way that there was no possibility for him to escape, he immediately put himself in a posture of defense by taking up a position in front of a large stone, where he could not certainly be attacked by any other animal, except under a great disadvantage; but to the means which we had, he could offer no resistance, and consequently fell."[104]

Capt. Sir. F. Leopold M'Clintock says: "I once came across a solitary old bull, which instantly faced me, spent a few seconds rubbing his horns against his fore legs (a sure sign that mischief is brewing), and rushed on me at full speed; but I had taken the precaution so to approach him that I was able to shoot him when he halted on the brink of the ravine, down which I had retreated."[105]

But new modes of destruction are invented without ceasing—though

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[103]Arctic Searching Expedition, 1851, I, pp. 323–24.

[104]Voy. Disc., p. 249.

[105]In MacFarlane's Mackenzie Basin, p. 174.

there is no offsetting armouring or multiplication of the animals. Commenting on the complete destructiveness of the established mode of rounding up with Dogs, and slaughtering from a safe distance, Stefansson says:

"This method was inferior to the one developed by Natkusiak's party at Cape Grassy. Natkusiak told me that it occurred to him one day to see how close he could get with safety, and that he got so close that he could touch the heads of the animals with the end of his rifle. If they charged, it would be one at a time, and he could always kill that one. He told me that the latter part of the summer, his party had scarcely ever been more than 10 yards away when shooting and commonly enough the powder would singe the hair. The animal stood with lowered head, and the bullet could be placed in the back of the neck just at the base of the horns, resulting in instant death and clean butchering.

"Occasionally, perhaps frightened by something else, a herd will run away on the first approach of danger. If they start running, they are more difficult to overtake than Caribou, which seldom run more than 8 miles. But commonly when Ovibos are alarmed, they will run to the top of the nearest small knoll and make a defensive formation spoken of as a circle or a square, although I have seen triangles and various irregular formations. Usually the big animals are on the outside with the calves in the centre. When there are 2, they will stand tail to tail, and when 3, they make a 3-pointed star. If danger is approaching from one side only, they may form in 2 or 3 lines with the biggest animals in the front rank and the smallest in the rear. Their central idea is one of defense, though they may charge upon occasion. Two animals may charge together, but I have never seen a whole band do so, nor have I heard of it. Usually they charge singly, each one making a short rush of from 10 to 15 yards, then whirling rapidly, running back to the herd facing about once more, and backing into line."[106]

His Way of Life

As I turn over the great masses of Muskox literature, I note without surprise but with weary regret, that nineteen-twentieths of it, at least, deals only with the slaughter of this picturesque old patriarch of the Polar Realm. So rarely is there anything about his way of life, that with little need of selection, I give all I can find. Hanbury's "Northland" is far more rewarding to the life-historian than anything else since Hearne. His opening picture of the Muskox Happyland is well worth reproducing:

"On the main Ark-i-linik [Thelon] River, there is a stretch of country about 80 miles in length into which no human being enters. The Eskimo

[106] Friendly Arctic, pp. 582–83.

do not hunt so far west, and Yellow Knives and Dog-Ribs from Slave Lake do not go so far east. To penetrate this country in the dead of winter would be simply to court starvation. Then the Deer have all departed, and to depend on finding Muskoxen at the end of the journey would be risky indeed. Thus there still remains one spot in this Great Barren Northland which is sacred to the Muskox. Here the animals remain in their primeval state, exhibiting no fear, only curiosity. I approached several herds within 30 yards, photographed them at my leisure, moving them round as I wished, and then retired, leaving them still stupidly staring at me as if in wonder. When Deer were not procurable, a Muskox was killed."[107]

As he travelled down this beautiful Northern stream with its sunny spruce-dotted banks, he lived on Caribou meat, and was glad to come across another Muskox. It stared innocently at the traveller from the near shore; and he etc., etc.

"We took enough meat to last us several days and proceeded down the river, meeting the same day several more Muskoxen. One remained close to us while we were pitching the tent in the evening. As he did not appear disposed to move off, I took my camera and approached within 30 yards, when I snapshotted him. He remained feeding on the willows, so I went still nearer. He showed no sign of fear, but I did, for I carried no arms. I ascended a small knoll below which he was feeding, and thus got within a few yards of him and snapshotted him again. I then wished for another shot in another direction, so I threw a piece of rock at him, which only produced an angry shake of the head. I threw several other missiles, but he only stood, angrily shaking his head, pawing the ground, and making a low, guttural grunt. I took one more photo and then retreated, leaving him to finish his evening meal in peace. He remained near our camp all night."[108]

On another occasion Hanbury says: "Following the stream slowly down, and spying the ground most carefully for Deer, I brought my glass to bear on an object such as I had not seen for many months, an old Muskox bull. He was lying absolutely still on the bank of the stream, and it required a second look to assure me that it was really a Muskox, and not a low bunch of scrub spruce. With good cover and a steady wind, I had no difficulty whatever in making an approach. As we were badly in want of meat, I took no risks, but fired 8 bullets into him as fast as I could. Poor brute! He could not make out what was up. He kept turning round as

[107]Northland, p. 13.
[108]Northland, pp. 39–40.

each bullet struck him, until he finally toppled over dead. He was a very large bull and in splendid condition; in fact, he was the only really fat Muskox I have ever seen killed."[109]

In 1907, I was privileged to visit the west end of this, the chosen range of the Muskox. In the short, bright summer from mid-May to mid-September, it was a land of bounteous pastures, rich, deep grass—knee-high grass in every valley—flowers in luxuriant beds everywhere; and even the bleak hillsides and tops were patched and carpeted with creeping foliage, as well as moss.

This is the richest pasture region in the range of the Muskox. It is far richer than any pasture I ever saw on the Plains portion of the Buffalo range. It was more nearly comparable with the prairie lands of Iowa and Manitoba. When the sharp frosts of early October come, these grasses for the most part wither; but they do not go to pieces or blow away. There are no devastating prairie fires to blacken the land, and ruin its pensioners. November snows are deep, and the Long Night Moon comes after.

Starvation and deep snow are nearly synonymous terms with most wild creatures. But the Muskox is equipped for just such yearly stress. With a woolly coat of adequate thickness, and the whole country one enormous sheet of provender, packed safe away in cold storage, he is an admirable instance of the well-known fact that animals care little about temperature, if only they have abundance of food.

Even the Buffalo suffered in a blizzard; but the Muskox is equipped to meet any measure of cold and wind. Nevertheless, he does not seek for hardship.

"In the depths of winter," says Hennessey, "they were practically never seen on the level land about Winter Harbour; but when parties travelled to points where the country was rugged, they were found in the valleys, which parts they sought as protection from the blizzards."[110]

The Message

Hitherto, the great service rendered by the Muskox has been to feed Arctic explorers whose energy outran their discretion; so that they were starving to death far beyond the reach of white man's resources. But the growing scarcity of the Muskox, combined with the ever-increasing prudence of the explorer, as his job took him farther afield, has upset the old adjustment.

[109]Northland, pp. 224–5.
[110]Muskox Monog., p. 201.

So also, the sudden increased demand for the robes, and greater facilities for travel toward the land of the Muskox, have had a sinister influence. Finally, in the Kingdom of Ice, the introduction of rifles among the Eskimo threatens to send the Muskox the way of the Dodo. In a hundred years, we have seen the Muskox range shrink to half, and the numbers to probably a tenth of what they were in 1800.

Two mighty influences there are, however, which may yet save the species from extermination: Sentiment and commercial value.

It was sentiment, intangible, unreasoning, but enduring sentiment—not commercial value—that saved the Buffalo and the Antelope, as well as many birds, from total extinction; and we may well believe that this protecting shield can be successfully raised over the Muskox.

Already it has developed into concrete action. The Canadian Government has set apart Southampton Island (and maybe also Coates Island and Mansell), in the northern part of Hudson Bay as a sanctuary for Muskox. This Island comprises about 20,000 square miles of ideal range like that long inhabited by the Polar Cattle on the mainland farther west; not that Muskox were ever found on it, but obviously it has all the makings of a Muskox pasture. It is the intention of the Government to stock this island and make of it a sanctuary, with a force of energetic Mounted Police, who will not only guard it against poachers, but will extirpate all beasts of prey that are a menace to the herds. So that here, at least, the Muskox may live in peace and multiply indefinitely. Here, at last, is a sanctuary inviolate in which the species may be preserved as a beautiful and undying example of the laws that made all life.

Commerce, though more brutal, is the more powerful force. Should it prove feasible, as many maintain, to grow this creature for its robe, wool, and flesh, so that these may become staples in the markets of the big world, then are we quite sure to save the Muskox.

The first step in this direction would be the complete domestication of the species. Its marvellous adaptability is seen in the fact that Muskox have been successfully kept for years at Woburn Abbey, England, at the Berlin Zoo, the Washington Zoo, and Bronx Park, New York. It is reassuring that recently in the last they have even bred.

Greely and many other men of the North have advocated the domestication of the Muskox. Its robe is already prized in commerce. Its wool, although but half the quantity per animal, is equal in quality to that of a Sheep, and has the unusual merit of never shrinking. Its milk is more abundant than that of Reindeer, Sheep, or Goat, and richer than that of a

cow. The meat of one Muskox is as much as that of 3 Sheep, and as nutritious as beef. The musky flavour, Stefansson claims, can be overcome by judicious selection of time and season, and by careful methods of butchery. In summary he says: "When you add to this that the animal does not roam in search of pasture, that the bulls are less dangerous than the bulls of domestic Cattle because not inclined to charge, and that they defend themselves so successfully against packs of Wolves that the Wolves understand the situation and do not even try to attack, it appears that they combine practically every virtue of the Cow and the Sheep, and excel them at several points."[111]

It is, however, as a range beast for the great Northern prairies of Canada, rather than as a barnyard adjunct, that Stefansson is chiefly interested in the creature. The establishment of refuges by the alert Canadian Government opens the way for such a development; and it is quite possible that we may in the near future, realize the dream of many who love the Northland and its native animals, and see presented to the world a range beast that is indifferent to the fiercest polar winter, and unique in its fitness for the whole of the vast Northern plains.

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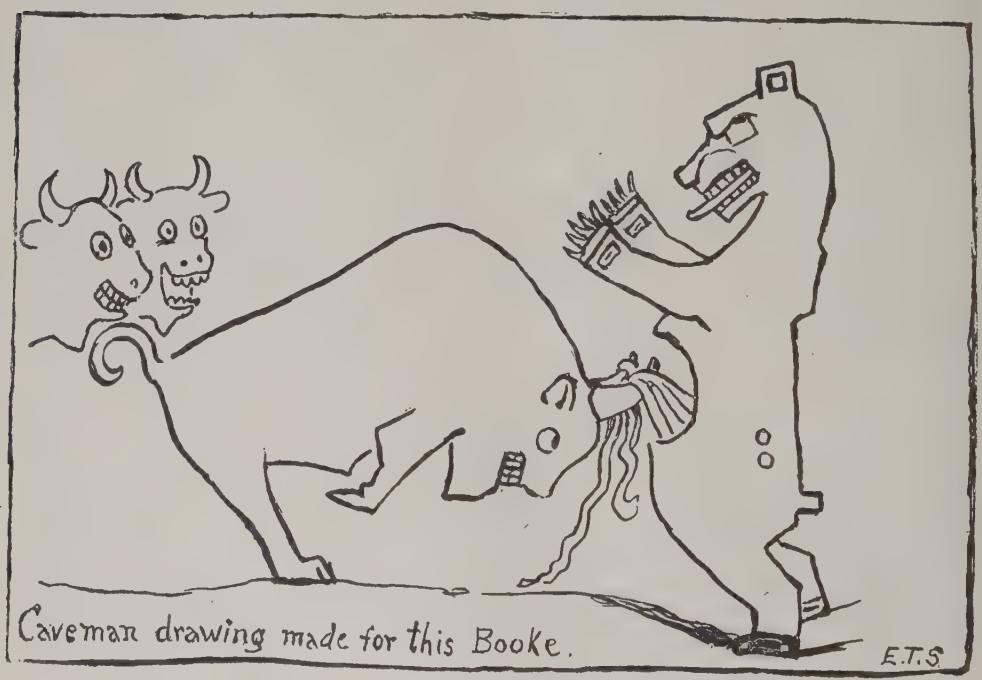

The American Bison, Buffalo, or American Wild Ox

Bison bison (Linnæus)

(Gr. and L., *Bison*, the shaggy, hump-backed, wild Ox of Europe; the true Bison)

Bos bison Linnæus, 1758, Syst. Nat., ed. 10. Vol. 1, p. 72.
Bison bison Jordan, 1888, Man. Vert., U. S., ed. 5, p, 337.

Type Locality—Mexico

French Canadian, *le Bison.*
Cree & Ojibway, *Mush-kwe-tay Pej-ee-kee* (prairie horned-beast).
Chipewyan, *Ed-jer-ay.*
Sioux, *Tah-tank-kah* (bull); *Ptay* (Cow).

The genus *Bison* (H. Smith 1827) has, in addition to all the Family characters: Curved cylindrical horns; a high hump on the shoulders, due to great prolongation of the spines of the vertebræ; a short tail; long woolly hair, especially on the head and fore parts.

$$\text{Teeth: Inc. } \frac{0-0}{4-4}\text{; can. } \frac{0-0}{0-0}\text{; prem. } \frac{3-3}{3-3}\text{; mol. } \frac{3-3}{3-3} = 32$$

The American Buffalo, in addition to the Family and generic characteristics, has peculiarities of size and colour indicated by the following:

Size. A full grown bull, that is, in fifth or sixth year, is $5\frac{1}{2}$ to 6 ft. at the shoulder (1,673 to 1,825 mm.); total length, 10 to $12\frac{1}{2}$ ft. (3,042 to 3,803 mm.); tail, 20 to 36 in. (507 to 913 mm.); hind foot, 23 to 26 in. (584 to 661 mm.).

The beard is usually 8 to 10 in. long (203 to 254 mm.). E. Carter, of Breckenridge, Colo., tells me that the longest beard he ever measured was 12 in. (305 mm.). The ordinary process of grazing tends to keep the beard of wild individuals worn down short. I have no doubt that the length given is exceeded in zoo specimens.

The cows are somewhat smaller, being about 5 ft. at the shoulder (1,521 mm.); total length about 7 ft. (2,132 mm.); tail, 15 to 20 in. (381 to 508 mm.); hind foot, about 20 in. (508 mm.)

Head. It is customary to speak of the enormous head of the Buffalo as a thing out of proportion to his bulk; but the Buffalo head divested of its wool, is of the same proportion as that of the Horse, Ox, or Dog. That is to say, at the shoulder, the animal is $2\frac{1}{2}$ heads high; and the body from the shoulder point to the croup is about $2\frac{1}{2}$ heads in length.

Weight. About 1,800 pounds is considered average weight for a bull, but Charles W. Payne, of Wichita, Kansas, tells me that in 1898 he weighed two living bulls at 2,220 pounds and 2,000 pounds respectively.

According to Audubon and Bachman,[1] fat cows weigh about 1,200 pounds, though Henry says[2] seldom over 700 or 800 pounds. The lesser weight seems to be nearer the average, but I have seen cows that stood as high, and looked as heavy, as ordinary bulls.

The Wood Buffalo collected by Harry V. Radford in 1909, weighed 2,402 pounds.

Colour. The bull has the head, tail, legs, lower parts of neck, and shoulders dark brown, shaded into lighter brown on the upper parts of the body, palest on the shoulders and hump. Toward spring, all the upper parts of the body bleach into a dull brownish yellow, beside which the head looks black.

The cow is similar, but darker in the body colour.

At birth, the calf is dull reddish yellow, paler on the legs and under parts; at six months, it is more like the mother; at two years, it is everywhere of a deep, glossy, blackish brown; after this, it again grows paler with age.

There were several well-known freaks and colour-varieties of the Buffalo "robe," as the shaggy pelt of the animal was called. The "beaver robe" was a rich brown with very fine fur; of these, not more than one in ten thousand was found. The "black robe," oftenest seen in the Mountain Buffalo, was less rare. The "buckskin robe," of a yellow tinge, a sort of half albino, had little value. There were also the "blue robe," which was slaty, and the "white or pied robe." This last was the rarest.

The White Buffalo. One or two of these in a lifetime was the utmost that any hunter secured. The Indians treasured them as "great medicine." Long writes[3] of one which John Dougherty saw in an Indian hut, "a Bison head very well prepared, which had a white star on the front. The owner valued it highly, calling it his great medicine; he could not be tempted to part with it, 'for,' said he, 'the herds come every season into the vicinity to seek their white-faced companion.'"

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[1] Q. N. A., II, p. 44.
[2] Journal, I, p. 171.
[3] Exped., I, p. 471.

Horns and Record Heads

The longest horns recorded in Rowland Ward's book (Records of Big Game, 1922 ed., pp. 427–28) are from Wyoming, and are in the possession of Lord Rendlesham. They measure: Length, on outside of curve, $20\frac{7}{8}$ in.; girth, 15 in.; widest inside, $30\frac{1}{2}$ in.

Next to this is W. H. Root's head, measuring: Length, $20\frac{1}{4}$ in.; girth, $16\frac{1}{8}$ in.; tip to tip, $33\frac{1}{2}$ in.; followed by that of P. Liebinger taken in W. Montana: Length, 19 in.; girth, $12\frac{1}{2}$ in. The last two are owner's measurements.

To these Ward adds 13 heads, whose horns are 14 in. long or over.

According to Montague Brown,[4] the largest recorded horns of this animal are 21 in. long with a girth of 15 in.; but August Gottschalk, of Boseman, Mont., has sent me statements, fully and legally attested, that he has a mounted head of which the left horn is 22 in. long, and $16\frac{3}{8}$ in. in girth at the base, the widest spread of the horns being 35 in. from tip to tip. He sends me also a photograph of the head of a grand old bull having a spread of $33\frac{1}{2}$ in. across the horns, the right having a length of $20\frac{1}{4}$ in. and a girth of $16\frac{1}{8}$ in. I have not seen either of these.

The record cow head in Rowland Ward's book is owned by Col. Ralph Vivian. Length, 14 in.; girth, $7\frac{1}{4}$ in.; tip to tip, 12 in. It was taken in Wyoming.

Races

Covering, as it does, so many diverse faunal areas, one might naturally expect the Buffalo to split up into several corresponding races; and it is generally recognized that, in a measure, it did so.

The far North produced the huge Wood Buffalo; the Rockies, the small dark Mountain Buffalo; the Plains, the paler, medium-sized Plains Buffalo; the forests of the Eastern States, the Black Pennsylvanian Buffalo, now extinct.

The following races have been recognized:

bison Linnæus, the typical form. T. l., Mexico.

athabascæ Rhoads, a large and dark form. T. l., near Fort Resolution, Mackenzie, Canada.

pennsylvanicus Shoemaker, much like *athabascæ*, but apparently larger and blacker; many of the old bulls being coal-black with grizzly white hairs around the nose and eyes; little or no hump. T. l., Pennsylvania.

[4]Encyclopedia of Sport.

History

The Bison, or Buffalo, the largest and, at one time, the most important of all America's big game, was discovered by the explorers of the 16th Century.

In 1521, Cortez, the Spanish conqueror of Mexico, reached Montezuma's capital, the City of Mexico, where, in the menagerie, he saw the first American Bison to be viewed by European eyes. The menagerie and the beast are thus described by Antonio de Solis.[5]

"In a second courtyard of that House, one could see all the Beasts, which had been made presents to Montezuma, or which were taken by his Hunters. They kept the fierce ones, such as Lions, Tygres, Bears, and the other kinds which New Spain produces, in strong cages of wood, arranged in good order in a covered place. But nothing was more surprising than the sight of the Bull of Mexico, a rare composite of several and divers animals; taking from the Camel the hump upon the shoulders; from the Lion, the flank dry and drawn up; the tail tufted, and the neck furnished with a long fringe in the manner of a mane; and from the Bull, the horns and the feet cloven. Outside of which, it imitates the ferocity of the last, in the vigour and the lightness with which it attacks."

But this was at least three hundred miles from the natural range of the Bison, which, as a wild animal, had yet to be discovered. This discovery took place nine years later; and again the honour fell to a Spaniard. In 1530, Alvar Nuñez Cabeza de Vaca was wrecked on the Gulf Coast. Travelling inland to what is now southeastern Texas, he met with the Bison on its native range. So far as known, this was the first meeting of the wild American Buffalo and the gun-bearing white man. De Vaca's remarks are brief but clear:[6]

"Cattle come as far as this. I have seen them three times, and eaten of their meat. I think they are about the size of those in Spain. They have small horns like those of Morocco, and the hair long and flocky, like that of the Merino. Some are light brown (*pardillas*), and others black. To my judgment, the flesh is finer and sweeter than that of this country [Spain]. The Indians make blankets of those that are not full grown, and of the larger they make shoes and bucklers. They come as far as the sea coast of Florida [now Texas] and in a direction from the north, and range over a district of more than 400 leagues. In the whole extent of plain over

[5]Histoire de la Conqueste du Mexique, III, 1691, p. 280.
[6]Davis's Spanish Conquest of New Mexico, 1869, p. 67.

which they roam, the people, who live bordering upon it, descend and kill them for food; and thus a great many skins are scattered throughout the country."

Coronado was the next explorer who penetrated the region inhabited by the Buffalo, which he traversed from the west, entering by way of Arizona and New Mexico, in 1540. He crossed the southern part of the "Panhandle" of Texas, as far as the edge of what is now Oklahoma, and returned through the same region. It was in the year 1542 that he reached the Buffalo country, and crossed the plains that were "full of crooked-backed Oxen, as the mountain Serena in Spain is of Sheep." One of his followers, Castañeda, gives a description of the animal, and adds: "We were much surprised at sometimes meeting innumerable herds of bulls without a single cow, and other herds of cows without bulls."[7]

The earliest discovery of the Bison in Eastern North America, or indeed anywhere north of Coronado's route, was made in 1612 somewhere in Virginia by an Englishman, Sir Samuel Argoll, afterward Deputy Governor of Virginia, who says:[8]

"I set my men to the felling of Timber, for the building of a Frigat, which I had left half finished at Point Comfort, the 19th of March; and returned myself with the ship into Pembrook [Potomac] River, and so discovered to the head of it, which is about 65 leagues into the Land, and navigable for any ship. And then marching into the Countrie, I found great stores of Cattle as big as Kine, of which the Indians that were my guides, killed a couple, which we found to be very good and wholesome meat, and are very easy to be killed, in regard they are heavy, slow, and not so wild as other Beasts of the wilderness."

He anchored then on the Potomac at the head of navigation; in other words, within what is now the District of Columbia. Thus, the English first saw the Buffalo within the present capital of the United States. The Spaniards first saw it in the capital of Mexico.

From this time onward, the region of the Buffalo was more often visited; and the explorers gave frequent descriptions of the great beast and of its vast numbers.

The earliest portrait that I can find was that given by Gomara in 1553. It is here reproduced, full size. Evidently it was drawn from the imaginative description of the discoverer. While corresponding, line for line, with the text, which corresponds, line for line, with the animal, it presents, in the language of the times, a monstrous beast indeed. (Plate CI.)

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[7]Davis's Spanish Conquest of New Mexico, 1869, pp. 206–07.

[8]Purchas Pilgrimage, 1625, Vol. IV, p. 1765.

Range in General

The accompanying map, (No.VII) showing the original range of the Buffalo, has been compiled from charts by George Catlin, and Dr. J. A. Allen, and with later information accumulated from other sources; but especially from data supplied by the Biological Survey. Those who wish for fuller details of the Buffalo in Pennsylvania are referred to S. N. Rhoads's writings, and those of Col. H. W. Shoemaker. (See References.)

It is generally supposed that the City of Buffalo, N. Y., was named from a near-by salt-lick that was frequented by Buffalo in early days. The question is discussed in Miller's "Mammals of N. Y."[9]

The recent finding of a Buffalo skull at Syracuse is strong supporting evidence. F. J. H. Merrill tells me (May 5, 1900) that this was dug up near the corner of So. Salina and Croton streets, Syracuse, N. Y., in the spring of 1889. It was identified by E. D. Cope and Gerrit S. Miller, Jr. It is now in the Museum of Syracuse University.

Since the accompanying map was prepared, evidence of much wider extension has turned up. Thus, Glover M. Allen records, "the discovery of a fragment of the maxilla with 2 milk teeth of a Bison at Orleans, on Cape Cod, Mass."[10] The find was made by Dr. A. W. Grabau.

"In 1826," according to Vernon Bailey, "Peter Skene Ogden, in charge of a party of trappers, discovered Harney Lake, which he graphically describes in his journal entry of November 1st, and he says 'Buffalo have been here, and heads are to be seen.' This carries them fifty miles farther west than the Malheur Cave, and I believe gives the westernmost record for Buffalo in the United States.[11]

Marcus W. Lyon, Jr., announces the discovery of some Buffalo bones, horns, etc., from Upper Tularosa River, N. M. This extends the range of them nearly to the western border of New Mexico.[12]

Range in Manitoba

When Alexander Henry came to Red River, in 1799, he found the Buffalo swarming all along the Red River Valley.[13]

Alexander Ross says,[14] "All this part of the country was overrun by the wild Buffalo, even as late as 1810."

[9] 1899, pp. 298–99.
[10] Journ. Mamm., Aug., 1920, p. 162.
[11] Journ. Mamm., Nov., 1923, p. 254.
[12] Proc. U. S. Nat. Mus., 1906, p. 648.
[13] Journal in References.
[14] Red River, p. 15.

MAP VII.—RANGES OF THE WHITE GOAT AND THE AMERICAN BUFFALO

By E. T. Seton with help of the Biological Survey, and (for the Buffalo) reference to the maps of Dr. J. A. Allen and Dr. W. T. Hornaday.

Range of the White Goat in primitive times, and practically unchanged to-day, in solid black. It lies chiefly in British Columbia, but overlaps the primitive range of the Buffalo in Montana and Idaho.

Range of the American Buffalo in outline and heavy shading.

In 1812, the first brigade of Scotch families arrived to found Red River Colony. Strange to say, this was the first year when the Buffalo did not graze over the site of modern Winnipeg.

In 1817, Buffalo were "far off" from Red River.[15]

In 1818, according to tradition, a large band came for the last time within a day's ride of Fort Garry.

In 1819, they could still be found in the country adjacent to Fort Pembina.[16]

In 1821, Buffalo were scarce at Pembina.[17]

In 1826, Buffalo were not found within 150 or 200 miles of Pembina.[18]

In 1849, the hunters went 250 miles from Pembina in the direction of Cheyenne River before finding the Buffalo herds.[19]

In 1852, the end of the Buffalo was evidently not far distant.[20]

Nevertheless, there were, at that time, many Buffalo still roaming the Big Plain where Carberry now stands. Captain John Schott, of Athabaska Landing, tells me that in 1852 when he was a boy of eleven years, he went with a party of Buffalo hunters (Saint Pierre Pierrot, Louison Bonnot, and Pierre Bonnot) in search of Buffalo, westward of Winnipeg. They found plenty of them on the Big Plain, and camped in the sandhills to the south where there was a good place to herd the Horses, and also high hills from which to see the Buffalo. Little John's job was to watch the Horse herd from some sandhill; and if they strayed too far he would go on his pony to round them up. Old Baldy, the high, bare sandhill back of Jim Graham's place, is pointed out as the Buffalo lookout.

The more recent skulls that strewed the Big Plain in 1882, dated chiefly from that hunt of thirty years before.

In the winter of 1856–57, according to H. Y. Hind, the Buffalo were very numerous on the banks of the Souris.[21]

In 1858, Hind found abundance of fresh Buffalo sign along the International Boundary, near Souris River.[22] He saw no Buffalo there, but records that there were great herds of these animals still on the summer range of the Côteau du Missouri, 50 miles to the southwest.[23] The fear of the Sioux, he says, kept most hunters out of that country.

[15]Ross, Red River, p. 47.
[16]As above, p. 50.
[17]As above, p. 58.
[18]As above, p. 99.
[19]As above, p. 255.
[20]As above, p. 267.
[21]Ass. & Sask., p. 43.
[22]As above, pp. 44–45.
[23]As above, p. 46.

At Two Creeks, Hind saw and shot the first Buffalo—a bull—on July 9, 1858. Next morning, as he journeyed toward Fort Ellice, he saw 3 more. Thirty miles west of the Fort, he says, "Buffalo were numerous."[24]

The last Buffalo band seen in Manitoba by John Schott was in 1861, when an immense herd was discovered in Grand Valley. They completely covered the site of the present town of Brandon.

In 1867, a trader, J. L. Legare, went on a journey from Winnipeg toward Wood Mountain. He told me that he saw the first Buffalo at Oak Lake; and during the winter of 1867–68, he and his partner lived on Buffalo killed on the Souris Plains, although the animals were then scarce, and only small bunches were to be seen. The great herd kept farther west, about Cypress Hills.

In 1874, Dr. E. Coues passed along the International Boundary without seeing any Buffalo, till he got to Frenchman's River, Mont., about Long. 107° 20,′ or 200 miles west of Manitoba.[25]

In 1875, a few stragglers were said to be on the Big Plain.

Dr. F. W. Shaw, of Carberry, tells me that in 1879, about Nov. 7th, as he was going to Rapid City from the Big Plain, he saw the tracks of 3 Buffalo at a place about 4 miles north of Grand Valley. They had been seen by a Mr. McFadden, while they were crossing the Assiniboine.

In 1882, C. C. Helliwell, of Brandon, saw 8 in the Souris region.

In the fall of 1883, according to A. S. Barton, of Boissevain, an old Buffalo bull crossed the Souris Plain from the southeast, going northwesterly toward Plum Creek. It was pursued by the Gale brothers on the Antlers of the Souris, but was never overtaken. When last seen, it was going toward Moose Mountain.

About this time, an old bull—probably the same—was seen near the site of the present town of Souris. My informant, H. W. O. Boger, says he saw it in daylight at 300 yards, as it crossed his farm. It was trotting, and went off northwest. A number of the boys went after it, but never got it. This was the last seen in the region. It was recorded in all the current newspapers.

In 1882, when first I went to live in western Manitoba, the prairie everywhere was dotted with old Buffalo skulls. Many had horns on them, but none had hair. Their condition and local tradition agree in fixing 1860 to 1865 as the epoch when the last Buffalo were killed on the Big Plain.

In the long slough east of Carberry, I have found many Buffalo bones; and on Aug. 13, 1899, I found a complete Buffalo skeleton there. No

[24]Ass. & Sask., p. 46.

[25]Birds, 49th Parallel, U. S. Geol. Surv. Terr., 1878, Bull. 3, p. 547.

doubt, all the large bogs throughout Manitoba contain skeletons of Buffalo that have been mired and engulfed.

Haunts

Although the map gives so vast an area as the range of the Bison in days gone by, it is not to be supposed that the species was equally abundant in all parts. We know, in fact, that it was comparatively rare in most of the wooded country.

The true Buffalo range was that part of the region which was without trees, and yet was provided with water, as will be seen on comparing the Buffalo map with the Forest and Plains map of America, Map IX. We find that in the East, the Buffalo followed the deciduous forests, and appeared to avoid coniferous woods. A study of the conditions prepares me for a find of Buffalo bones on the north side of Lake Erie.

In all this wooded country, however, its numbers were small, the true home of the species being the open region of the great Mississippi River Valley, where the land was unforested and yet well watered. On this only, was it ever found in herds of millions.

Migrations

All observers agree that the Buffalo in great herds visited parts of the country where at other times they had been unknown; and they remained for a time until impelled to another change of residence. The questions arise: Were these regular movements up and down certain routes? Was the change made under stress of weather or famine, or both? In other words, was the Buffalo truly migratory?

To this question, Catlin gives an emphatic "No."

"These animals," he writes,[26] "are, truly speaking, gregarious but not migratory—they graze in immense and almost incredible numbers at times, and roam about and over vast tracts of country, from East to West, and from West to East, as often as from North to South."

There is, furthermore, abundant proof that the herds were found summer and winter over most of the animal's natural range. This is all the evidence I can find for the non-migratory theory.

On the other hand, all records, even those of Catlin, refer to the coming and going of the Buffalo, as not perfectly regular, but quite seasonal; while most records speak especially of summer and winter ranges, as regions where herds were to be found at set times.

[26]N. Am. Ind., 1866, I, p. 248.

Col. R. I. Dodge tells[27] of "an immense herd on their journey north"; "one mass of Buffalo moving slowly to the northward," that he saw on the Arkansas in May, 1871.

At Beaver Creek, 100 miles south of Glendive, James McNaney says[28] that the Buffalo began to arrive *from the north* in the middle of Oct., 1882; that about the first of December, an immense herd came; that by Christmas, all had *gone southward;* but that a few days later, another great herd came *from the north* and *followed* the rest.

The half-breeds and old hunters along the Red River have often told me of the northward coming of the Buffalo in spring, and of their southward migration in the fall.

Colonel R. I. Dodge's many valuable observations on the migratory habits of the southern Buffaloes tend to the same conclusions:

"Early in spring," he says,[29] "as soon as the dry and apparently desert prairie had begun to change its coat of dingy brown to one of palest green, the horizon would begin to be dotted with Buffalo, single or in groups of two or three, forerunners of the coming herd.

"Thicker and thicker and in larger groups they come, until by the time the grass is well up, the whole vast landscape appears a mass of Buffalo, some individuals feeding, others standing, others lying down, but the herd moving slowly, moving constantly to the northward. . . . Some years, as in 1871, the Buffalo appeared to move northward in one immense column, oftentimes from 20 to 50 miles in width, and of unknown depth from front to rear. Other years the northward journey was made in several parallel columns, moving at the same rate, and with their numerous flankers covering a width of a hundred or more miles.

"The line of march of this great spring migration was not always the same, though it was confined within certain limits. I am informed by old frontiersmen that it has not within twenty-five years crossed the Arkansas River east of Great Bend, northwest of Big Sand Creek. The most favoured routes crossed the Arkansas at the mouth of Walnut Creek, Pawnee Fork, Mulberry Creek, the Cimarron Crossing, and Big Sand Creek.

"As the great herd proceeds northward, it is constantly depleted, numbers wandering off to the right and left, until finally it is scattered in small herds far and wide over the vast feeding grounds, where they pass the summer.

"When the food in one locality fails they go to another, and towards

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[27]Hunting Grounds, p. 120.

[28]Hornaday's Ext. Am. Bison, p. 421.

[29]Our Wild Indians, pp. 283–86.

MAP VIII.—BUFFALO MIGRATIONS

The dark area in each case marks the winter range. The arrowheads show direction of migration. Their ancient route along Red River is marked with straight dotted lines.

This illustrates the local nature of Buffalo migration. The Saskatchewan herd and the Red River herd kept apart, and followed each their own route. In the early years of the 19th Century, the Red River herd went north by the Souris and the Qu'appelle valleys, and came south along the Red River. But in 1820, on account of the growing Selkirk settlement, they abandoned the Red River, and went south by the Pembina Hills route. It is believed that the whole Buffalo range was occupied by similar herds with like migrations.

PLATE XCIX.—GOING TO WATER

PLATE C.—THROUGH THE MIST

Drawn by E. T. Seton, 1892

fall, when the grass of the high prairie becomes parched up by heat and drought, they gradually work their way back to the South, concentrating on the rich pastures of Texas and the Indian Territory, whence, the same instinct acting on all, they are ready to start together on the northward march as soon as spring starts the grass."

Hind, the leader of the famous exploring expedition to the Canadian Northwest in 1859, has left some valuable records[30] as to the Buffalo movements on which chiefly I have founded the accompanying map. It is remarkable that the Saskatchewan herd should have wintered in its coldest region. Probably the explanation is that this happened to comprise the best feeding grounds.

Alex. Henry's record given below shows that, in 1800, the stream of migration both northward and southward, moved parallel with and close to the Red River. The change to the route near Turtle Mountain began about 1812, when the first settlers came to Lord Selkirk's land grant; it was directly caused by the increase of hunters in the neighbourhood.

There is only one sure way to determine the question of migration. That is by a series of observations made during a number of years at one point where the Buffalo abounded. Twenty years ago, we should have said, "Too late for that," but now the discovery of Alexander Henry's precious old "Journal in Red River Valley" has shed some light on the Buffalo and most other bygone creatures of that now famous land of grain.

Henry's observations were made at Park River Post, a fort which he built on the Red River at a point 35 miles south of the International Boundary. The Buffalo lived in that region the year round, though less numerous there than higher up the river. I have collected all his remarks on their migration:

September 18, 1800. "The plain was covered [with Buffalo] on the W. side of the river as far as the eye could reach. They were moving southward slowly."[31]

November 7th. "Great herd of cows going at full speed southward."[32]

January 1, 1801. "Buffalo in great abundance. . . . The plains were entirely covered; all were moving in a body from north to south."[33]

January 14. "The river was covered with Buffalo moving northward."[34]

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[30] Ass. & Sask., p. 106.
[31] Journal, p. 99.
[32] As above, p. 136.
[33] As above, p. 162.
[34] As above, p. 167.

January 15. "The plains were still covered with Buffalo moving slowly northward."[35]

During January, 1803, he found the country from Park River to Riding Mountain crowded with Buffalo.[36]

November 15, 1805. "Terrible snow storm, Buffalo passing northward in as great numbers as ever I saw them."[37]

Three of these being northward movements in winter seems to contradict the idea of regular migration; but the writer expressly says that the last was during a blizzard; and presumably the others were in some sort of storm, as he speaks of 15 inches of snow. In Manitoba, blizzards come always from a northerly point. The Buffalo always faced the storm; hence, perhaps, this irregular movement.

I conclude that the Buffalo did migrate from 300 to 400 miles northward in spring, and as far southward again in autumn; but that the regularity of this movement was often much obscured by temporary changes of direction to meet changes of weather, to visit well-known pastures, to seek good crossings of rivers or mountains, or to avoid hostile camps, and places of evil memories. Furthermore, there were scattered individuals to be found in all parts of the range at all seasons.

Theoretically, the Buffalo must have been migratory. Although it covered a vast region, it continued of one species; whereas, it would probably have split up into several distinct species had it not been continually mixed as a result of migrations.

Ancient Numbers

The early explorers who describe the Buffalo bands do not give us anything more exact than superlative expressions, such as "countless herds," "incredible numbers," "teeming myriads," "the world one robe," etc.

To gain a more precise idea as to the numbers of this species, it is necessary to attempt an estimate, as follows:

The total area inhabited by the Buffalo was about 3,000,000 square miles. Of this area, open plains constituted about one half. According to figures supplied me by A. F. Potter, of the Forest Service, the ranges of North and South Dakota, Montana, Wyoming, Nebraska, Kansas, Colorado, Texas, and Oklahoma (a total of about 750,000 square miles, or half of the Plains) carried at the time of the last census (1900) about 24,000,000 head of Cattle and Horses, and about 6,000,000 head of Sheep. This means

[35] Journal, p. 167.
[36] As above, p. 208.
[37] As above, p. 273.

that, when fully stocked, these Plains might sustain a number of Buffalo at least equal to the number of Cattle and Horses. But the Buffalo had to divide their heritage with numerous herds of Mustang, Antelope, and Wapiti.

On the other hand, a Buffalo could find a living where a range animal would starve. Moreover, many of the richest bottom lands are now fenced in; and we have taken no account of the 6,000,000 Sheep. On the whole, it seems that we are safe in placing the number of Buffalo formerly living on the entire Plains area as about 40,000,000.

The range of the species on the prairies was a third as large as that on the Plains, but it was vastly more fertile; indeed, the stockmen reckon one acre of prairie as equal in fertility to four acres of the Plains. Doubtless, therefore, the prairies sustained nearly as many head as the Plains; we may safely set their population at 30,000,000.

The forest region of the Buffalo area supported a relatively sparse population. For its 1,000,000 square miles, we cannot allow more than 5,000,000 Buffalo.

Summing up these totals, we arrive at the conclusion that the primitive number of Buffalo was about 75,000,000.

Let us consider the question from another standpoint: There were 1,500,000 square miles of the Plains; it takes 30 acres of such range to support an ordinary range beast, which needs as much as, or more than, a Buffalo. There were as many of the latter as the food could sustain; therefore, the Plains had 30,000,000. But take off one third to allow for the herds of other creatures, and we have 20,000,000 as the number of the Plains Buffalo. On the prairies and in the woods, 10 acres a head is the usual range allowance; but doubling this to allow for Deer, etc., it would give us a population of 45,000,000, or a total of 65,000,000 Buffalo.

Again: Col. C. J. Jones estimated[38] the Buffalo in 1870 at 14,000,000. They were then occupying less than one third of their range, and were not nearly so crowded as in ancient times; their original total, therefore, must have been at least 50,000,000.

Yet again: All the evidence available goes to show that the Buffalo herds travelled from 100 to 400 miles in search of food; and that these herds broke up speedily to find sustenance; and, therefore, that the herds never went more than 300 or 400 miles from their home region.

Col. R. I. Dodge describes a northward-moving herd that was at least 25 miles across, and extended north and south as far as the eye could see.

[38]Forty Years, p. 255.

Since it was all day in passing, it was at least 20 miles deep. When so massed, Buffalo run frequently 25 to the acre. But halving that for moderation, we have a herd of at least 4,000,000. This was on the Arkansas in May, 1871.[39]

If this herd had been gathered from the extreme limits from which they are known to congregate, it would represent an area of 200,000 square miles. There would be room enough to repeat this about 15 times on their range, and thus yield a population of about 60,000,000 as the sum of the Buffalo in primitive days, when their whole range was stocked as fully as the food supply would permit.

From these facts, it will appear very safe to put the primitive Buffalo population at not less than 60,000,000.

The Dwindle

In 1800, there were practically no Buffalo east of the Mississippi. Their range had shrunk by one eighth, their numbers doubtless in even greater degree; 40,000,000 head would be a fair estimate at that time.

The Duke of Bedford's herd of Buffalo at Woburn Abbey, England, was begun in 1896 with 7 animals, and had increased to 25 in 1905, notwithstanding a loss of 11 by deaths. That is to say, it has increased 20 per cent. each year, and in six years had doubled.

A similar rate of increase is seen in the Corbin herd. However these figures represent an abnormal rate of increase, as the animals are constantly protected, and never suffer for lack of food.

The total of Buffalo in captivity in 1889 was 256; since then, they have added about 10 per cent. per annum in spite of many disadvantages, such as isolated animals, overfeeding, overproduction of males, etc. If, therefore, we set the annual rate of increase in the wild herds at 5 per cent., as long as they are within the limit set by food supply, we shall probably be near the facts.

In early days, the Buffalo held their own well against the Indians with their primitive weapons. But, in the full splendour of the Buffalo days, say about 1830, the Indians, aided now by Horses and armed with rifles, killed, as will be seen, more than 2,000,000 each year. Allen estimated that in 1845 "probably 2,000,000 a year is much less than half the number killed at this time by the Indian alone."[40]

In 1852, Baird assembled many pertinent facts and figures; then, to be conservative, divided the latter by 3, and says: "We shall still have

[39]Hunting Grounds, p. 120.

[40]History Bison, p. 562.

an annual aggregate of nearly 3,500,000 as the number [of Buffalo] destroyed by the upper Missouri tribes alone."[41]

Other means of destruction added at least half as many more to the number; so that 3,000,000 a year may easily have been reached as a total of loss in the '30's. To stand such a drain, with their slow rate of increase, the herds would have had to be at least ten times as numerous as they were. But they could not stand it, and they were plainly diminishing. Therefore, they must have fallen below 40,000,000 even as early as the beginning of the 19th Century. Nevertheless, they could not have been much less than that, or they would have vanished far faster than they did.

The Pennsylvania Buffalo

This Buffalo appears to have been much like the Wood Buffalo, but larger and darker—almost black. Although the first race seen by English-speaking folk, it was the last to be described. Col. Henry W. Shoemaker gave it the name "*pennsylvanicus*" in 1915, in his valuable "Pennsylvania Bison Hunt" (pp. 16–17).

It is hard to realize now that the woods of Pennsylvania contained thousands of Buffalo as late as 1750. Their pathways through the woods were the most convenient ways of travel for mankind.

As late as 1773, when Philip Quigley settled on the West Branch, Clinton Co., Pa., the great Northern herd of Buffalo "still numbered about 12,000 animals."

These facts are fully set forth in the above pamphlet by Col. Shoemaker; also in "Extinct Pennsylvania Animals," Part II, 1919, by the same author.

He writes me under date of Oct. 27, 1925, as follows:

"As to the Buffaloes in Pennsylvania, the last one in Somerset County was killed by Joseph Shank in the Glades of that county in 1810, according to George W. Grove, a noted local historian of Somerset County; and another one was killed in Northumberland County by Frederick Stamm in 1810. The hide of the Northumberland County Buffalo figured in a sale at Boalsburg, Centre County, in 1917, according to Mr. John W. Hess of Boalsburg, who stated that the hide had been in the possession of the Stamm family since the animal was killed. This hide was purchased by a representative of Col. Theodore Davis, not knowing its historical significance, for $19, and is now in his home in Boalsburg.

"The last Buffalo was driven out of Buffalo Valley, Union County, in the direction of Lewistown by Jacob Weikert in 1808. Col. John Kelly

[41]Pat. Off. Rep. Agri., 1851–52, Pt. II, p. 125.

killed a Buffalo at the Buffalo Cross Roads in Buffalo Valley in 1801; and the last herd of Buffaloes was wiped out in the White Mountains of Union County in 1799."

The Pennsylvania Buffalo is practically unrepresented in any museum. The young naturalist can do good service by watching excavations that are in progress anywhere in Pennsylvania, and especially in bogs. For in these we are likely to find skulls, bones, and even complete skeletons of this most interesting species.

The Wainwright Herd

In 1873, a Pend d'Oreille Indian named (Sam) Walking Coyote, captured 4 Buffalo calves, and brought them into the Flathead country of northwest Montana. In 1882 or 1883, they had increased to 14, and were bought by Michel Pablo and Charles Allard, half-breeds, who lived on the Flathead Reservation.

In 1893, Allard and Pablo bought the remnant of Buffalo Jones's herd at Omaha—some 26, not counting 18 hybrids or Cattalo.

Meanwhile, the authorities at Ottawa had determined to develop a herd of their own. Their small beginning is thus recounted by Commissioner Harkin:

"The first consignment of Buffalo received in Canada as the nucleus of the present herd came from the Good Night Ranch, Texas, in 1897. This allotment consisted of 2 two-year-old females and 1 three-year-old bull, the gift of T. J. Blackstock, Toronto, and was placed at Banff."[42]

During this time, Allard and Pablo had carefully guarded their herd. In 1902, it had increased to 220, not counting 57 sold to various zoos, etc., or 65 hybrids.[43]

In 1906, the free range was rapidly disappearing. At that time, the United States Government decided to open the Flathead Reservation for settlement. This forced Pablo and Allard to sell the herd. The Government offered a rather low price, which the half-breeds scornfully refused. Before the officials returned with a better offer, the Canadian Government, in 1907, secured the lot at $245 per head, f.o.b., Edmonton, Alta., on the understanding that they should receive not less than 500 Buffalo.

Pablo and Allard duly set about their wild task of catching and delivering the herd. The most desperate old Buffalo hunter in the crowd was more than satisfied with the excitement furnished. When the transfer was complete, the half-breeds had delivered 672 head of Buffalo; and reported

[42]Personal letter, April 28, 1926.

[43]M. J. Elrod, Recreation, June, 1902, p. 445.

MAP IX.—FOREST, PLAINS, AND PRAIRIES OF NORTH AMERICA (EXCLUSIVE OF MEXICO)

C. S. Sargent's Map No. 1, Tenth Census of United States, Dep. Int., 1880, with corrections in Canada from the Atlas recently published by the Department of the Interior of Canada (1906)

Showing coniferous forest in dark tint, deciduous forest in pale tint, prairies in dotted tint, and treeless plains in white tint

that about 150—the wildest and toughest old bulls—were still at liberty, defying all attempts to drive them, rope them, or run them down.

These, with 117 secured from other sources, were safely planted in Buffalo Park, which comprises 162 square miles of rough, rolling range at Wainwright, Alta.

The exact details have been supplied by Commissioner J. B. Harkin, of the Canadian National Parks Branch, Dept. of Interior, Canada, as follows:

"A total of 672 head in all were obtained. This comprised the entire Pablo herd with the exception of a few outlaws it was found impossible to round up for delivery with the final shipment. Shipments and distribution were made as follows:

1st shipment to Elk Island Park	June, 1907	199 head
2nd " " " " "	Oct., 1907	211 "
3rd shipment to Buffalo Park	June, 1909	177 "
4th " " " "	Oct., 1909	25 "
5th " " " "	June, 1910	46 "
6th " " " "	May, 1911	7 "
7th " " " "	June, 1912	7 "
Total number shipped		672 "

"Subsequently in June, 1909, 325 head of these Buffalo, then in Elk Island Park, were transferred to Buffalo National Park, Wainwright, Alberta. At the same time, 77 head were transferred from Banff National Park to Buffalo National Park.

"In addition to the purchase of the Pablo herd, the Department purchased 30 head from the Conrad estate at Kalispell, Montana, paying $250 per head, crated, f.o.b. point of shipment.

1st shipment to Buffalo Park	Nov., 1910	15 head
2nd " " " "	Mar., 1911	15 "
Number of Conrad Buffalo		30 "

This implantation of 702 Buffalo increased rapidly, so that at the end of March, 1921, they numbered 4,609, with a prospective increase each year of 1,200 to 1,500.

Now the Government was in a predicament; for, even with artificial feeding in winter, 5,000 was the utmost that the Park could support. The fact that it contained also 419 Mule-deer, 155 Elk, 23 Moose, 4 Antelope, 15 Cattalo, 5 Yak, and 16 Cattle, which were steadily increasing, added to the complication. In brief, the range could sustain no more. It was not

possible to add to the Park, for all about it are prosperous farms. So, henceforth, there would be a surplus of at least 1,500 Buffalo each year to dispose of.

A few hundred were absorbed by other Parks or by zoos all over the world, at good prices. But that market was soon glutted.

"During the winter of 1922–23, 264 of the older surplus Buffalo bulls were killed as an experiment. In view of the continued large increase in the herd and the consequent shortage of pasture, it was decided to carry out slaughtering operations on a larger scale during the winter of 1923–24, when the animals were in good flesh and the fur prime. The total number of Buffalo slaughtered in these two operations was 2,145, of which 94 per cent. were males. This is about three times the number of the herd originally brought into the park."[44]

But many objections were made to this plan; "the Government was going into the Cattle business," etc.

It then occurred to the officials who had so successfully managed the wild life of Canada, that although they could not accommodate the annual increase by adding to the Park in the adjoining territory, they had at their disposal a 10,000 square mile tract in the Wood Buffalo Park recently created (1922). To this, they proposed to send the annual surplus, and turn them loose.

As soon as their plan was known, a storm of protest from many scientists broke about the Dominion officials. These onlookers maintained that the Wood Buffalo was a rare, interesting, and valuable species, and the introduction of Plains Buffalo in such numbers would virtually and unnecessarily wipe out the Wood Buffalo form.

To this, the Northwest Territory Branch of the Department made reply: In the Wood Buffalo Park are two quite distinct herds, in widely separate parts of the country. That in the north is the pure Wood Buffalo —if there is such a thing. That in the south, is halfway between the Wood and the Plains Buffalo. It is to the latter that the surplus of Wainwright is to be added. Furthermore, if the protesting scientists agree in disapproving this plan, let them propose another that is more satisfactory and yet practical.

To this challenge, no reply has been made. So that in 1924, the Northwest Territories and Yukon Branch of the Department demonstrated the wisdom and practicability of the scheme by safely shifting, per rail and scow, 1,634 Buffalo from Wainwright to the Peace River end of the Buffalo Park; where, with the trifling loss of 8, they joined the herds of their kinsmen.

[44]Comm. J. B. Harkin.

It is proposed to continue these importations until the south part of the Wood Buffalo Park is so completely stocked that its herds can be turned to economic account.

In summary, therefore, let us keep in view the following facts: The Wood Buffalo Park is 10,500 square miles, equal to the States of Massachusetts and Rhode Island together; the actual wild country adjoining is at least equal to the combined areas of North and South Dakota; in this, the actual surplus will soon be 5,000 Buffalo per annum. This surplus the Department of the Interior at Ottawa is wisely conserving and administering as a food and sport supply that will also yield a handsome revenue.

Thus, we cannot but applaud the wisdom of the Canadian Government that has been quick to profit by the error of her big sister in the south, and to save for judicious administration the remnant of the Buffalo.

Since the above was written, I learn from Director O. S. Finnie, that in the late fall and early winter of 1925, some 400 head of Buffalo wandered southward out of the Park boundaries, and wintered in the Baril and Clair Lakes districts, a low-lying country with abundance of hay. They continued sleek and fat all winter, and in the spring returned northward across the Peace River, and are once more in the original Park.

As it is possible that this migration may take place yearly, the Government is adding this new region to the Park. It will increase the area from 10,500 to 17,000 square miles. In this, the Buffalo will be protected and, no doubt, thrive and multiply.

Wiping Out the Plains Buffalo

At the beginning of the 17th Century, as we have seen, the Buffalo range covered some 3,000,000 square miles reaching from the Atlantic Ocean to Oregon, and from Great Slave Lake to the Gulf of Mexico. Their numbers were not less than 50,000,000 at this time.

About the beginning of the 19th Century, the Buffalo were cleared out of all the country east of the Mississippi.

In 1832, according to Catlin,[45] 150,000 to 200,000 robes were marketed each year; which meant a slaughter of 2,000,000, or perhaps 3,000,000 Buffalo by the Indians. The destruction was already so great that Catlin prophesied the extinction of the Buffalo "within *eight* or *ten* years." The drain was obviously more than the natural increase, and already the vast herds were shrinking visibly. About 1834 or 1835, they began to diminish very rapidly on the western slope of the Rockies, as Fremont records.

[45] N. A. Ind., I, p. 263.

But the eastern slope was the great Buffalo range. Concerning these two areas, this famous explorer writes:[46] "The extraordinary abundance of the Buffalo on the east side of the Rocky Mountains, and their extraordinary diminution, will be made clearly evident from the following statement: At any time between the years 1824 and 1836 a traveller might start from any given point south or north in the Rocky Mountain range, journeying by the most direct route to the Missouri River, and during the whole distance his road would be always among large bands of Buffalo, which would never be out of his view until he arrived almost within sight of the abodes of civilization.

"At this time [1842] the Buffalo occupy but a very limited space, principally along the eastern base of the Rocky Mountains, sometimes extending at their southern extremity to a considerable distance into the Plains between the Platte and Arkansas rivers, and along the eastern frontier of New Mexico, as far south as Texas."

Fremont reckoned the annual market of Buffalo robes as 90,000.[47] But robes were collected only during the four winter months; not more than a third of those killed at this season were skinned, while half of the robes were used at home, and never sent to market. Therefore, 90,000 robes represented a slaughter of about 1,920,000 Buffalo. But the rate of killing was so much higher in summer, that we may calculate the annual kill at 2,000,000 or 2,500,000 during these palmy Buffalo days. The Buffalo Indians had been decreased by the smallpox; but the white consumers more than made up the shortage. Naturally, therefore, the herds shrank fast.

In 1842, Fremont found distress among the Indians along the Platte on account of failure of the Buffalo.[48] In 1852, the Buffalo were so far from the Red River country (Manitoba), that Ross considered hunting them a thing of the past.[49]

In 1867, the Union Pacific Railway reached Cheyenne, penetrating the heart of the Buffalo country. It carried unnumbered destroyers with it, and split the remaining Buffalo herd in two. Thenceforth, it was customary to speak of the "south herd" and the "north herd," each of which appeared to recognize a boundary in those sinister lines of steel.

In 1868, William F. Cody undertook to supply meat to the construction gangs of the Kansas Pacific Railroad. He says: "It was at this time that the title 'Buffalo Bill' was conferred on me by the railroad hands. . . .

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[46]Expl. Exped., 1845, pp. 144–45.
[47]As above, p. 145.
[48]As above, p. 145.
[49]Red River, p. 267.

"During my engagement as hunter for the Company, which covered a period of 18 months, I killed 4,280 Buffaloes, and had many exciting adventures with Indians."[50]

On a wager with another Buffalo hunter, Cody killed 69 in one day, near Sheridan, Kans., in 1868; his rival, Billy Comstock killed 46.[51]

In this autobiography of 328 pages, he mentions seeing Antelope but once, Elk twice, and no other animals, except, of course Buffaloes.

Slaughter of the South Herd

In 1871, the Santa Fe Railway crossed Kansas, the favourite summer ground of the southern herd, now reduced to about 6,000,000 according to Buffalo Jones.[52] Then began the great slaughter by the white skin-hunters.

Doctor Allen says "the total killed between 1870 and 1875 cannot have been less than about 2,500,000 annually."[53] At first these came chiefly from the southern herd, which was virtually wiped out in 1875.

A few scattered bands lingered in out-of-the-way places, but were relentlessly hunted down. The last considerable herd that I can learn about was in 1886, described to me seven years afterward by Charles Norris, cowboy, of Clayton, N. M., whose narrative is full of interesting detail. The date seemed to me very late for so large a herd, but cross-examination did not make him change it.

The Last of the South Herd

The last big bunch of Buffalo he ever saw was in the "Panhandle" of Texas. He came on them in May of 1886. He was driving some Horses from Coldwater to Buffalo Springs; and, when 35 miles east of Buffalo Springs, he saw the herd about 3 miles off; and knew at once they were Buffalo, because they were all of one colour.

Next day, on returning, Norris saw the Buffalo again about 15 miles farther east, and rode in among them. Some were lying down, and some were grazing. They seemed about 200 in number; only 6 were little calves. As soon as they saw him, they bunched like Cattle and kept "milling" around. Then one bull made a lead to stampede; but none followed him, so he came back to the bunch. Another bull then started from the bunch, and tried to lead off. He ran about 100 yards, but he also returned.

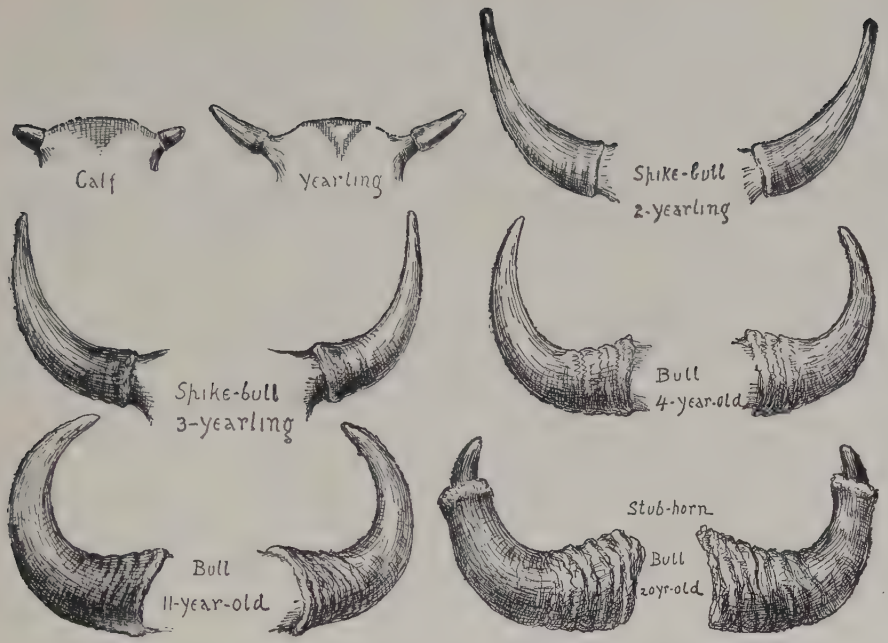
Then one in the bunch that seemed a third larger than any other,

[50]Buff. Bill's Own Story, 1920, p. 118.

[51]As above, p. 125.

[52]Forty Years, p. 255.

[53]History Bison, p. 566.



Series of Buffalo horns

Redrawn from "Extermination of the American Bison," by W. T. Hornaday

Freak horn from Saskatchewan

In collection of James Hargraves, of Medicine Hat

Freak Buffalo horn found on the Black Plateau

Collected in 1895 by Frank H. Mayer

Drawn from photograph in *Outdoor Life*

PLATE XCIV.—BUFFALO HORNS, NORMAL AND ABNORMAL

"lit out"; and all following him, strung out in a semicircle. Norris tried to cut across to the middle of it; but instead of running away, part of them hung back, and it seemed as if they were going to surround him. He thought it wiser to fall back and get out of the ring. Then they strung off after the big leader.

Norris galloped behind, trying to rope a calf, but the mother turned on him. He had no gun, and his Horse was tired, so he gave it up. He noticed that in running, they "pawed" for a time with one side low; then changed to the other. After they went off, he rode on 15 miles southeast to camp.

A. N. Cranmer was in charge of the camp, which was by a small lake. He said: "This is the only water in the region, and they will be certain to come in here before three days." So the men waited; and on the second day, the whole herd appeared. Now they had a good chance to count them. There were 186. Here the men killed a cow and a bull.

They then set about roping some calves. Norris caught one, and Cranmer caught two. They had to kill the mother of the last, as she showed fight. The herd went off, and these men saw no more of it. One of the calves died, and Norris gave his to Cranmer's little boy, who sold it to Charles Goodnight of Clarendon, Texas. The other was traded to a passing stranger from Kansas for a span of colts.

In the November of the same year, on the same trail, Norris saw 12 head of Buffalo, but has never seen one since.

The very last individuals that I have knowledge of, were found in 1889. The account of them I got from William Allen, cowboy, also of Clayton, N. M., four years after the event. I give it in full.

About Aug. 20th, while out with a party hunting Mustangs, in the Neutral Strip, about 12 miles northeast of Buffalo Springs, the riders saw 4 animals, which they supposed were Mustangs, as they were rolling in the dust. They were about 3 miles away, on the south side of a little knoll. The hunters rode around on the north side, and got within 75 yards, to learn that these were 4 Buffalo.

The Buffalo took alarm at once, and started off westward, closely pursued by the hunters for about 3 miles. Here they met a man driving a bunch of Mustangs. The two bunches, Mustangs and Buffalo, joined. The men chased them for 2 miles, when they parted; the Mustangs turning to the left, keeping up the X I T fence, and the Buffalo going to the right. Allen chased these about 5 miles farther, and right into two of his own party. The Buffalo circled from them south and west 3 miles back, then right back to the X I T fence again. He fired four shots into a cow.

She quit the bunch, and went 2 miles to a lake, while he chased the three right through the X I T fence, and left them.

The men then returned to the cow at the lake; she ran into the deepest water, and stood at bay. After resting a short time, she came out of the water, and they shot her. A photographer, who was with the camp, took the pictures of the party with the skin and meat in view. That was the last Buffalo that Allen ever saw. He learned that the three were killed later on.

The North Herd

The great northern herd was still in existence, after the southern was wiped out. A colder winter, and the presence of hostile Indians, were the chief deterrents of the white skin-hunters.

Buffalo Jones offers the following table of Buffalo numbers.[54] Other writers have thought him too conservative in his estimates. In this, he does not discriminate between the two herds, which were about equal in numbers. It is well, therefore, to remember that after 1873, the south herd was gone, and the north herd numbered between 1,500,000 and 2,000,000.

Year	*No. of Buffalo*	*No. Killed Past Year*
1865	15,000,000	1,000,000
1870	14,000,000	1,600,000
1871	12,400,000	4,500,000
1872	7,500,000	4,000,000
1873	2,500,000	1,000,000
1874	1,500,000	500,000
1875	1,000,000	300,000
1876	700,000	100,000
1877	600,000	75,000
1878	525,000	70,000
1879	455,000	60,000
1880	395,000	70,000
1881	325,000	80,000
1882	245,000	85,000
1883	160,000	90,000
1884	70,000	50,000
1885	20,000	15,000
1886	5,000	4,000
1887	1,000	500
1888	500	350
1889	150	150

[54] Forty Years, p. 255.

Indians and North Herd

Valuable historic light on Buffalo, Indian, and white man is furnished by the Missionary, Father A. McG. Beede, in an article on the Buffalo Days. He writes:

"They say that from the year 1864 onward till after the Sitting Bull-Custer battle they—the Western Sioux Indians—kept the Buffalo herded back into Montana or the extreme western part of the present North Dakota. This statement, strange as it may seem, is confirmed by numerous white frontiersmen. . . .

"Old Indians say, and other evidence shows, that these Sioux Indians extended their herd line as far north only as the Kill-deer Mountains—never called Killdeer Mountains by the Sioux—and to the point on the Missouri River just north of these mountains. Meanwhile, the Buffalo, now quite safe from ruthless depredation by white men, increased greatly in numbers; and in the summer of 1875, many of these Buffalo crossed the Missouri from the south side to the north side—from the present McKenzie County to the present Williams County and Mountrail County—and thus escaping the Indian herd line, they roamed up and down the Missouri, often swimming the river forth and back, and going as far down the river as Painted Woods, 60 miles up river from Bismarck, N. D.

"All white frontiersmen know well that from 1864 onward till after the Sitting Bull-Custer battle, no Buffalo were to be found on the vast plains west of the Missouri River and east of this Indian herd line, except a very few that occasionally slipped through the herd line and were not followed by Indians and killed for food. But from 1875 on, large numbers of Buffalo were sometimes found in the north country which was beyond this Indian herd line, and some of them wandered as far east as the Turtle Mountains country.

"The Buffalo herds that crossed the Missouri in the late summer of 1879 or 1880, and those that drifted east from Montana after the Custer fight, mingled together in the territory west of the Missouri River, and for three years after 1879 there were so many Buffalo in that country that only a few thoughtful men supposed that the time should ever come when Buffalo hides could not be had in plenty.

. . . . . .

"After the Sitting Bull-Custer battle, which was the end of this careful attention given to the Buffalo by the Western Sioux Indians, the Buffalo that had thus increased in numbers came freely eastward, and seemed, at times, almost to fill the plains country west of the Missouri River in North

Dakota. In old times, Indians never ruthlessly slaughtered Buffalo, or other animals. They used what was necessary and preserved the rest. The Buffalo were the Indians' Cattle.

"The Western Sioux Indians regarded Buffalo stealing about as a Dakota cattle-rancher regards Cattle stealing—as a crime deserving death. This Buffalo stealing by white men in the Dakotas was many times more the cause of trouble with the Sioux than all the gold in the Black Hills. I know this from hearing old Indians freely talk among themselves. That the trouble was chiefly caused by the Black Hills gold is an erroneous notion of the matter originated by white men. This notion has become fixed in written history, but it is incorrect."[55]

The Finish of the North Herd

In 1876, the United States troops pacified or drove the hostile Indians out of the Missouri country, opening the way for the skin-hunters. In 1878, the last great herd went south from the Saskatchewan, and the few scattered bands left behind were killed off by the Indians in 1879. In 1880, the North Pacific Railway opened a way into the central country of the last herd, and the southern story was repeated with even greater rapidity.

When first I went West, in 1882, there were skulls aplenty on every open plain, but the Buffalo were reduced to a few thousands,—certainly less than half a million. In 1885, there was no considerable northern herd in the United States.

The remnant, numbering perhaps 200 or 300, was scattered in droves among the Badlands between the Missouri and the Yellowstone. One of these bands, numbering 40 or 50, took refuge in the rough country along the Big Porcupine River, where 28 of them were killed in 1886 by an expedition to secure, at this the last moment, a series of specimens for the National Museum.

The rest of those in the United States, were soon picked off by cowboys and hunters.

The Remnants in Canada

But a few small bands lingered on the Upper Saskatchewan for several years.

James M. Macoun tells me that in early July, 1888, he saw the meat of 8 Buffalo bulls that were killed between Methy Portage and Lac la Biche. They were the last seen there.

In 1889, according to the Reverend J. A. McLaughlin, missionary of Victoria, north of the Saskatchewan, and Wm. L. Hine, the taxidermist of

[55]In the Days of the Buffalo, by A. McG. Beede, Forest & Stream, June, 1921, p. 248.

Winnipeg, a band of 11 was found in Hand Hills, 500 miles west of Manitoba. Five were killed by Indian acquaintances of McLaughlin. He saw part of the spoils, including a head, which sold at Winnipeg for $120. The other 6 were not accounted for.

The only wild Buffalo now left are those preserved in the Yellowstone Park, and the herd of Wood Buffalo that finds a refuge in the woods and on the Plains of Great Slave River.

Census

How many Buffalo, both wild and domesticated, all told, are now living? This is a question put by all who are interested in the subject. For a clear expression of their numbers, their decline, and the rescue of the survivors, I shall set the various figures in column:

Estimate of the Buffalo in primitive days		60,000,000
Estimate of the Buffalo in 1800		40,000,000
Estimate of the Buffalo in 1850		20,000,000
Col. C. J. Jones's estimate, 1870		14,000,000
Miller Christy's census* (of which 200 were in captivity)	1888	1,300
About 1895 they probably reached a minimum of		800
Mark Sullivan's census† in	1900	1,024
S. P. Langley's census,‡ Feb. 6,	1902	1,394
Dr. Frank Baker's census,§	1903	1,753
Dr. Frank Baker's census,¶	1905	1,697
American Bison Society Census (An. Rep.)	1908	1,917
" " " " " "	1910	2,108
" " " " " "	1911	2,760
" " " " " "	1912	2,907
" " " " " "	1913	3,453
" " " " " "	1914	3,788
" " " " " "	1916	5,592
" " " " " "	1918	6,466
" " " " " "	1920	8,473
" " " " " "	1921	9,311
" " " " " "	1923	12,457
" " " " " "	1924	14,369

*"The Last of the Buffaloes," London Field, Nov. 10, 1888, p. 697.

†"The Buffalo Still Lives," Boston Evening Transcript, Oct. 10, 1900.

‡Am. Bison in U. S. and Canada, U. S. Dept. Int., 57th Congress, 1st Sess., Senate Doc. No. 445, pp. 38–39.

§Stat. Am. Bison, 1905, Nat. Zool. Park, Smithsonian Institution.

¶Stat. Am. Bison, 1906, Nat. Zool. Park, Smithsonian Institution.

For Jan. 1, 1924, the Bison Society offers the following details:

Numbers To-day

Summary of Bison Census for Jan. 1, 1924

Captive in U. S.	4,167
Wild in U. S.	125
Captive in Canada	8,877
Wild in Canada	1,200
Captive in North America	13,044
Wild in North America	1,325
Total pure-blood Bison in North America	14,369
Captive in South America and foreign countries	76
Total pure-blood Bison throughout the world	14,445
Calves born in 1923, included in the above total	2,491

Summary of United States Government Herds (9 in all)

Montana National Bison Range, Montana	560
National Zoological Park, Washington, D. C.	16
Niobrara Reservation, Nebraska	46
Pisgah National Forest & Game Preserve, North Carolina	3
Platt National Park, Oklahoma	3
Sully's Hill National Park, North Dakota	13
Wichita National Forest & Game Preserve, Oklahoma	147
Wind Cave National Park, South Dakota	106
Yellowstone National Park, Wyoming	758
Total number of Bison in U. S. Government Herds	1,652
Calves born in 1923, included in above total	266

With over 14,000 Buffalo at the beginning of 1924, adding 20 per cent. per annum to their number, it is easy to believe that we have now, in 1926, over 20,000 of the American Buffalo still alive,—abundance for all present needs.

Domestication

The pure-blooded Buffalo has not proven a success as a domestic animal Its obstinate and often ferocious temper remains unchanged by contact with man. The cows when with the calves, and the bulls at all times are of a fierce, combative disposition. One never knows when this may break out.

A number of men have been killed by tame Buffalo; and those who know them best, trust them least.

During various times, in setting forth these Lives, I have proclaimed with emphasis that such and such a wild creature is absolutely harmless to man—Wolf, Cougar, Bear, etc.; let them alone and they will not harm you. I might, indeed, make the same sweeping statement for all of those herein treated. However, I must now frankly admit a notable exception: that is the Buffalo. At all times and places, the Buffalo, male and female, old and young, are savage, treacherous animals; always a menace to man and beast; never to be trusted. The Buffalo is a dangerous animal, the only really dangerous one in America. If we had exact figures to show, I believe we should find more human beings killed by Buffalo than by any other of our wild creatures.

So far as I can learn, the earliest systematic effort to domesticate the Buffalo took place in Manitoba. In 1877, some Indians returning to Winnipeg from the West brought with them 5 Buffalo calves (1 bull and 4 heifers). These became the property of James McKay (Tonka Jim), and were allowed to run about the outskirts of the town until 1882. Then the herd, numbering 23, came into the possession of Warden Sam L. Bedson, by whose courtesy I was enabled to examine the herd at Stony Mountain, and gather full information.

The account, which I partly reproduce, appeared in the May, 1886, edition of my "Mammals of Manitoba" as well as in the *Manitoba Free Press*, May 28, 1886.

The Bedson Herd

At the present time (Jan., 1885) the herd numbers 41; of these, 6 are half-breeds with the common Cattle; 6 are three-quarter bred; and the rest pure Buffalo. The object of domesticating these beasts is to provide an animal better suited to the requirements of the Northwest than the common animal, which is, of course, unable to bear the winter without a certain amount of housing and feeding.

These Buffalo receive no care beyond what is necessary to prevent their wandering away or being stolen. They live on the open prairie summer and winter, subsisting on the wild grass, even when they have to dig for it through one or more feet of snow. Nor is it a bare existence that they so maintain; for when I saw them late in January, they were finding grass enough, not merely to feed, but to fatten them. When a blizzard comes on, they lie down close together with their backs to the wind, and allow the snow to drift over them; so that under the combined protection

of the snow and their own woolly coats, they are perfectly comfortable. In Jan., 1884, one of the cows calved on the open prairie and though at the time the thermometer registered 38 degrees below zero, neither cow nor calf appeared to suffer the slightest inconvenience.

In 1888 this herd had increased to 58, not counting 25 half-breeds. In November of the same year, they were bought by Colonel C. J. Jones (Buffalo Jones), of Kansas, and added to the 57 already in his possession.

From these, at least in part, have been supplied most of the herds now in captivity.

Cattalo and Yakalo

At present, experiments are being made with hybrids between Buffalo and more docile breeds of Cattle.

Buffalo (Col. C. J.) Jones has made many investigations along this line, and believes in a hybrid form between the Buffalo and Common Cattle. This "Cattalo," as he calls it, is especially suited as a range animal for the Far North. It has the advantages of being exceedingly hardy, fearless of blizzards, able to paw and root through the snow for grass when ordinary Cattle would starve. Above all, it produces a robe which is very superior even to that of a Buffalo—worth, indeed, as much as an entire ordinary steer. However, the continued interfertility of the hybrids has not yet been proven, and is, indeed, much questioned by geneticists.

Alaska and Canada are the countries for which these experiments have a special interest.

The Canadian Government, through its Bureau of Wild Life, is experimenting now with Yak and Buffalo hybrids. His Grace the Duke of Bedford, in 1908, presented to the Canadian Government a herd of 6 Yak. These and their descendants have been kept at Banff, and at Wainwright chiefly. They now (1921) number 26, not counting half a dozen donated to other zoos.

This hybrid, or "Yakalo," has all the advantages of the Cattalo, and is even better equipped to find its own living in a land of frost and snow.

The Buffalo Wool Fiasco

The Red River was the scene of another attempt to turn the Buffalo to commercial account.

In 1822, there was founded at Fort Garry a joint stock company called the "Buffalo Wool Company."[56]

[56]Ross, Red River, pp. 69–72.

The partners proposed to gather the Buffalo wool and use it as a substitute for that of the Sheep. Undoubtedly, the wool in question would make a good, serviceable cloth; but the difficulty of getting the raw material in quantity and, above all, the mad mismanagement of the enterprise, ended the scheme in a disastrous collapse.

Ross informs us[57] that a yard of the cloth fetching 4s. 6d [$1.08] in England, cost £2 10s. [$12] to make on Red River.

Flies and Wallows

As the summer grows warm, the Buffalo shed their coats in great, broad flakes or wads of mothy-looking felt, till the hinder half of their bodies becomes positively nude. And now the mosquito millions are turned loose. I suppose that even a Rhinoceros would be annoyed by these long-beaked stingers of the lush, wet prairies; and the Buffalo, with their naked rears, are driven to accept any promise of relief. Standing on a high knoll in a strong wind is said to be "good medicine" against the flies. But such a combination is not always available; and, besides, it precludes feeding. A much more convenient protection is found in a supplementary coat of mud.

Catlin's description of the Buffalo habit of "doping for flies" is old, but worthy of repetition; for he saw it in its highest development, and on numberless occasions:

"In the heat of summer," he says,[58] "these huge animals, which, no doubt, suffer very much with the great profusion of their long and shaggy hair or fur, often graze on the low grounds in the prairies, where there is a little stagnant water lying amongst the grass; and the ground underneath, being saturated with it, is soft, into which the enormous bull, lowered down upon one knee, will plunge his horns, and at last his head, driving up the earth, and soon making an excavation in the ground, into which the water filters from amongst the grass, forming for him in a few moments a cool and comfortable bath, into which he plunges like a Hog in his mire.

"In this *delectable* laver, he throws himself flat upon his side, and forcing himself violently around, with his horns and his huge hump on his shoulders, presented to the sides, he ploughs up the ground by his rotary motion, sinking himself deeper and deeper in the ground, continually enlarging his pool, in which he at length becomes nearly immersed. And the water and mud about him mixed into a complete mortar, which changes his colour,

[57] Ross, Red River, p. 72.

[58] N. A. Ind., I, pp. 249–50.

and drips in streams from every part of him as he rises up upon his feet, a hideous monster of mud and ugliness, too frightful and too eccentric to be described."

This practice seems to have been much more popular with the bulls than with the cows—a fact which seems to prove that the flies alone were not the cause of it. The bulls were more heavily clad with wool on the fore parts, and therefore, suffered more from the heat. Also they gathered more of the prickly seeds that are an active irritant of the skin.

Chief among these plants on the northern Plains is the "spear grass" or "wild oat" (*Stipa spartea*). In July, it seeds abundantly. Each seed is like an oat, with a sharp corkscrew point and a long barley awn; but set everywhere with fine bristles pointing backward. When this contrivance touches the wool of a Buffalo, its barbs at once cling; and by a complete hygroscopic mechanism, first carefully studied by Miller Christy,[59] it revolves seven or eight times in an hour, boring through the wool and finally reaching the skin.

Every prairie man remembers the sharp prick of the speargrass. First its corkscrew penetrates his clothing; then it attacks his person. Every sheep-owner, too, can testify that it keeps on boring, even through the skin; till an angry, irritating sore is produced. This aggressive plant was, no doubt, one of the plagues that drove the Buffalo to the wallows. A proof of this, as Christy points out, is seen in the fact, that the old wallows are rimmed about with an unusually thick and vigorous growth of spear-grass. The newer generation calls them "fairy rings."

Rubbing Posts

The wallow was not the only offset to the skin-tickling. Rubbing places were in great demand. It is well known that the posts of all the first telegraph-lines across the Plains were thrown down, again and again, by the Buffalo rubbing against them. Even when the poles were protected by sharp spikes, the big brutes were not deterred from utilizing these delightfully convenient scratching posts. They were, indeed, attracted, rather than repelled, by the additional tang thus given. Further, as every settler on the Plains of the Souris knows, the boulders there are smooth, and have a hollow worn around them, by the scrubbing and trampling of Buffalo for generations, availing themselves of the chance for a vigorous rub. There are some famous examples of this on the top of Pilot Mount, Manitoba. Old travellers along the Red River tell of all the trees being rubbed

[59] On the Power of Penetrating the Bodies of Animals Possessed by the Seed of *Stipa spartea*. Read before the Linnæan Society, London, Feb. 21, 1884.

smooth, like those in a farmyard. There is, indeed, little doubt that the Buffalo have helped to extend the prairies, and to reduce the woodland country by rubbing down the trees.

Buffalo Chips

The Buffalo's sanitation is of the crudest type; its excretions are left anywhere. Such is the rule among creatures that have nothing of the nature of a nest or home place.

Those of us who knew the Buffalo in the old days, recall the essential service rendered by the Buffalo chips, or dried, flat cakes of Buffalo dung. These are primarily finely ground-up grass and herbage, glued together with juices of digestion into solid cakes, that speedily dry out and furnish excellent fuel—the only fuel known on the Plains. Wherever trader, trapper, or hunter bivouacked, all were dependent on Buffalo chips for the comfort of fire. As these benevolent contributions kept their shape for years, they abounded on all of the Buffalo range. Cattle chips and Horse chips are possible fuel, and much used; but for some unknown reason, were far inferior to the Buffalo chips, which give a hot, clear, steady, and nearly smokeless fire.

Diseases

The old Montana trader and Buffalo hunter, Charles Aubrey, writes: "Except scab, I have never seen any diseases among the Buffalo. At times, the young Buffalo as well as the old bulls were thus affected; but the disease was not deep-seated like the form of scab in Cattle; still I have seen cows die from scab."

In the vast herds, some forms of lameness were at times noticed in individuals, due to their hoofs being deformed by injury to the young in the crush of a wild stampede, such as I have known them to make at night in the winter, when they might go over a cut bank on to the ice of a river, when many were killed by piling on top of each other.

"My old Indian friend, The-Horn, told me that once on a trip to war against the Crows—being out of meat—they ran Buffalo. Behind the herd, were found two young cows so exhausted that they could not move when approached. "They were sick, the skin being very hot and cracked all over. Only at long intervals had he seen Buffalo in that condition; and then but few of them.

"When butchering Buffalo at the end of the chase, I have frequently examined their lungs, but never found any symptoms of tuberculosis or other affection of the lungs.

"I killed a young bull in good flesh which had a large abscess on the liver; and two young cows, both fat, in same condition. Another had badly affected kidneys."[60]

Enemies

The chief natural enemies of the Buffalo herds, taken in inverse order of importance, were insects, blizzards, Wolves, prairie fires, bogs, the Indian, and rivers. Epidemic disease, as already noted, seems to have been unknown among them.

Insect plagues meant less to the Buffalo than to most of the ruminants. Their thick wool and tough hides, reinforced by a coat of mud, rendered them nearly indifferent to the attacks of mosquitoes; and so far as known, the warble, the gad-fly, and the nose-fly did not pester them.

A suggestive sidelight is furnished by the following incident. A town boy and a country boy of my acquaintance in Scotland, were suddenly confronted by a herd of wild, Highland Cattle. The boys were on foot; and the Cattle, evidently excited and hostile, came towards the boys, led by the bull. At first, the herd walked; then came running towards the strangers. There was no tree or cliff near by. There seemed no chance of escape from death. But the Highland boy was wise. He stopped, faced the bull, and began a low, sharp buzzing—a good imitation of a hornet; he increased and varied it. After a moment's hesitation, the wild Cattle turned and fled over the moor.

The Blizzard

Hitherto, the blizzard has been entirely ignored as a destroyer of Bison. My attention was first called to it by Romanzo N. Bunn, of Chicago. He brings forward evidence to show that the last great herd inhabiting the country north of the region between Yankton and Devil's Lake, and between the Big Sioux River and the Missouri, was destroyed by the blizzard of 1871–72. He states that in the '70's, hundreds of thousands of Buffalo crossed the Missouri River, going northward; and that they had never returned, nor were they accounted for by the hunters. Senator D. L. Pettigrew, of Flandreau, Dak., informed him that after the terrible winter of 1871–72, he found herds of Buffalo lying dead in the hollows, evidently buried where they had sought shelter.

Concerning his own experiences, Bunn writes me:

"After months spent in prospecting throughout the Northwest during 1880, I reached a point a few miles to the westward of the Big Sioux River, and settled upon government lands in Kingsbury County, present State

[60]Forest & Stream, July 25, 1908, p. 133.

of South Dakota. There I noted with astonishment the enormous number of Buffalo skeletons lying bleaching upon the prairies. The adult skeletons were, at that time, in a perfect state of preservation, showing, for the most part, no signs of having been disturbed since the death of the animal. Reasoning that, if they had been killed by hunters, I should find broken limbs, skulls with bullet-holes in them, and marks of rifle-balls on the bones, I searched often and diligently for these signs, but I found none. True, a stray shoulder-blade, older in appearance than the rest, had a spear-head sticking through it, as evidence that an Indian had killed this animal many years before; but, on the newer-looking and complete skeletons, no mark of violence was to be observed.

"Evidently, they had not been killed by hunters. They lay stretched out on the prairie, large animals and small, on upland and lowland; usually singly, though one day I found fifty in a bunch, lying in a ravine. These seemed mainly small or young animals. I observed that just to the north, was one of the highest hills in the locality, the situation being such that, within an hour after a big blizzard had gotten up full steam, this ravine would probably be ten feet deep with snow.

"I pondered much upon this subject, for there were at least 200 of these skeletons on my own half-section. By the time the next season opened, however, I had ceased to wonder how they died, for the cause became evident.

"The winter of 1880–81 is still known to the early settlers of Dakota as the 'blizzard winter,' and the storm of October 15, 1880, as the 'October blizzard.' The morning of that day, following a rainy night, opened with a fast-falling snowstorm and a gale from the north. You could not see a house twenty feet away. To venture from shelter during the next two days was to endanger your life. Although early in the season and the temperature not very low, the soft, wet snow would weigh down your clothing in a few moments, so you could scarcely bear the burden. When it cleared, on the morning of the 17th, the entire aspect of the landscape seemed changed. The prairie at this point is quite rolling, and cut by many dry water-courses; although there is not a living stream in the country, and not a tree in sight. On that morning, the whole country had been brought to practically a dead level. The quantity of snow was almost beyond belief. Everywhere, it entirely hid the prairie grass, lying a foot deep even on the highest ridges. Wide ravines, 20 feet deep, were full to the top; and these held much snow as late as the following May.

"Cattle belonging to various settlers had drifted away during the storm and, in spite of the fact that it was early in the season and the Cattle in good

condition, many were lost, For example, a pair of heavy, strong work-oxen had passed over the brow of a hill, and were standing on their feet in the drift, dead. Their backs were on a level with the surface of the snow, their noses elevated in an effort to prevent smothering, the large horns disclosing their location.

"In such a blizzard, no escape was possible for even the hardy Buffalo. They would have been buried in the sheltering hollows where they sought repose, and would there have shared the fate of the old oxen. Large clusters of bones found in such spots indicate that this had indeed happened—that their deadliest enemy was the snow.

"To repeat, the great herds that went north in 1870–71, never returned. There is no evidence that any large numbers of them were killed by hunters, red or white; and there is, therefore, but one reasonable explanation of their disappearance. They were exterminated by the blizzards of 1870.

"Further, I believe that, at all times, the Dakota blizzard has taken heavier toll of the Buffalo than ever the Dakota Indian did."

The Silver Storm

Another deadly climatic visitation is fully described by G. B. Grinnell. He says: "The winter of the beginning of the year 1856 was the severest ever known by the Cheyenne Indians. Its hardships are still well remembered, and every old man and old woman can recall that terrible season. For a long time, the whole prairie was covered with ice, and the Buffalo and Wild Horses could not travel on it, but fell down and could not regain their footing. . . .

"The Indians had plenty to eat from the Buffalo that they killed; but the Horses, having nothing to eat, slowly starved; and before the party got back to the village, every Horse had died."[61]

During this winter, there can be little doubt that most of the Buffalo and Antelope were wiped out in the region scourged by the storm. It is not known just how far it extended; but it probably covered most of southeastern Wyoming.

Commenting on a similar condition on the Saskatchewan in 1810, Alexander Henry writes: "April 18, 1810. He [Mr. Rocque] saw upward of 60 dead Buffalo. At this season, many are so weak that if they lie down they cannot rise."[62]

No one who has seen the northern blizzard will question its terrible power. I have lived through several; and agree with Bunn that a winter

[61] Winter War Stories, Forest & Stream, March 5, 1910, p. 369.

[62] Journal, p. 594.

with a long succession of these snow-typhoons might, in certain circumstances, destroy every Bison on the range.

No one who has seen an ice or silver storm on the Plains, can doubt that it is a more fearful visitation than a plague. It means death to all prairie creatures that are non-hibernant, and dependent on grass.

But blizzards *did not happen every winter*, and they were restricted to a certain limited treeless area lying far north and in which the snowfall was heavy. Silver storms were rare, for they had to begin in rain, and end in fierce frost. So that I doubt whether, upon the whole, the destruction by weather stress was comparable with that by other agencies which were of more regular and more general occurrence on the Buffalo range.

The Grim Gray Wolf

Every Buffalo band was followed by Wolves that picked off the young, the weak, and the wounded; and thus kept the herds up to a good physical standard. But on the whole, the reduction by Wolves was not great.

The fitness of the Buffalo to combat this enemy is illustrated in the following incident which had taken place at Wainwright Park, in June, 1914, a few days before my arrival.

Three mounted men, under direction of the Warden, were trying to corral a Buffalo cow that was to be shipped. The poor success of their efforts provoked the ridicule of a visitor who, accompanied by a fine collie, was looking on.

"My Dog is worth more than the lot of you for a job like that," he exploded in scorn.

"Can your Dog handle a Buffalo?" asked the Warden.

"Can he? He has handled hundreds of Cattle and many big bulls. He could run that Buffalo into the corral all alone, and in three minutes."

"What will you bet?"

"Fifty dollars. Here it is!"

The money was covered. The Warden ordered the riders to stand back. The Cattle drover shouted to his Dog: "Here, Shep! put her in! Sic her! That one, there!"

Away went the keen and intelligent Dog, without a moment's hesitation; dashing, as he had done a thousand times successfully, at the rear, and nipped the heel of the Buffalo cow. By all the rules, she should have sprung forward and away from the Dog. But, in the words of the Warden: "She spun around on a ten-cent piece," and with one swift blow of her mighty foot, she smashed that Dog to earth. He lay a flattened corpse.

Tears came into the drover's eyes. "I don't mind the money," he said,

"but I wouldn't have taken $500 for that Dog; he was the best in the world."

"Now," said the Warden, "you see that a Buffalo is a very different creature from a common cow."

The Buffalo were trained on Wolves.

The Plains Ablaze—Buffalo Blinded

Prairie fires not only destroyed the food of the Buffalo, but were the source of direct danger to the animal, as we realize in reading this extract from Henry's "Journal":[63]

"November 25, 1804. Plains burned in every direction, and blind Buffalo seen every moment wandering about. The poor beasts have all the hair singed off; even the skin in many places is shrivelled up and terribly burned, and their eyes are swollen and closed fast. It was really pitiful to see them staggering about, sometimes running afoul of a large stone, at other times tumbling down hill and falling into creeks, not yet frozen over. In one spot we found a whole herd lying dead. The fire having passed only yesterday, these animals were still good and fresh, and many of them exceedingly fat. Our road was the summit of the Hair Hills [Pembina Mt.], where the open ground is uneven and intercepted by many small creeks running eastward. The country is stony and barren. At sunset we arrived at the Indian camp, having made an extraordinary day's ride, and seen an incredible number of dead and dying, blind, lame, singed, and roasted Buffalo. The fire raged all night toward the S. W."

Hind, in 1859, made similar observations:[64]

"Blind Buffalo," he says, "are frequently found accompanying herds, and sometimes they are met with alone. Their eyes have been destroyed by prairie fires; but their quickened sense of hearing and smell, and their increased alertness enable them to guard against danger; and makes it more difficult to approach them in quiet weather than those possessing sight. The hunters think that blind Buffalo frequently give the alarm when they are stealthily approaching a herd in an undulating country. When galloping over stony ground, blind Buffalo frequently fall, but when quietly feeding they avoid the stones and boulders with wonderful skill."

Treacherous Bogs

The obstinacy in adhering to one course, that characterized the Buffalo, often led many to their death in the treacherous bogs. Dodge says:[65]

[63] Journal, pp. 253–54.

[64] Ass. & Sask., p. 107.

[65] Hunting Grounds, p. 122.

"Late in the summer of 1867, a herd of probably 4,000 Buffalo attempted to cross the South Platte, near Plum Creek. The water was rapidly subsiding, being nowhere over a foot or two in depth, and the channels in the bed were filled or filling with loose quicksands. The Buffalo in front were soon hopelessly stuck. Those immediately behind, urged on by the horns and pressure of those yet farther in rear, trampled over their struggling companions, to be themselves engulfed in the devouring sand. This was continued until the bed of the river, nearly half-a-mile broad, was covered with dead or dying Buffalo. Only a comparatively few actually crossed the river, and these were soon driven back by hunters. It was estimated that considerably over half the herd, or more than 2,000 Buffalo, paid for this attempt with their lives."

Such sights were far from rare along the Missouri, though seldom seen on so large a scale.

I doubt not that every great bog and quicksand in the Central Northwest will prove on drainage to be a Buffalo bone-yard, containing countless skeletons that date from the earliest days; and there can be little question that, in a measure, this is true also of Pennsylvania.

The Arrow Indian

The primitive Indian was far from being the greatest enemy of the Buffalo. Armed with bow and arrow or lance, and without the aid of a Horse, he could scarcely count solely on the Buffalo for his livelihood. In winter, he could pursue the animals on snowshoes, and slay them easily enough. But there was rarely sufficient snow for this: all the circumstances precluded the possibility of great destruction of Buffalo life by this means. Moreover, the opportunities for such slaughter were confined to the North. On rare occasions, the tribe could unite and form a Buffalo pound. But there was usually a sufficiency of small game to make this great effort not worth the while; and I doubt not that, before the coming of the Horse and rifle, the Redman did little harm to the great Bison herds. These two principal aids arrived together on the Buffalo range, about the close of the 18th Century, and they marked the beginning of the epoch of extirpatory slaughter by man.

Rivers and Rotten Ice

By far the worst destroyer of the Buffalo in ancient days was treacherous ice in the springtime. All winter, the Buffalo herds of the colder range were accustomed fearlessly to cross and recross the icebound rivers. Springtime comes with the impulse to wander farther north; the herds are more

compacted now; they slowly travel on their route; river after river is crossed at first. But a change sets in; the ice grows rotten; to all appearance it is the same, but it will no longer bear the widely extended herd. The van goes crashing through to death, and thousands more are pushed in by the oncoming masses behind.

The records of early travellers, we now realize, have much of this subject. But the best I can find is still from the garrulous and ever-delightful Alex. Henry:[66]

"March 30, 1801.—It [the ice on Red River] continued to drift . . . bearing great numbers of dead Buffalo from above, which must have been drowned in attempting to cross while the ice was weak. . . .

"Wednesday, April 1st. The river clear of ice, but drowned Buffalo continue to drift, by entire herds. Several are lodged on the banks near the fort. The women cut up some of the fattest for their own use; the flesh appeared to be fresh and good. It is really astonishing what vast numbers have perished. They formed one continuous line in the current for two days and nights. One of my men found a herd that had fallen through the ice in Park River, and all been drowned; they were sticking in the ice which had not yet moved in that part."

Later, writing of the Mandans on the Missouri, he says:

"When they collect the driftwood, great numbers of drowned Buffalo that have perished in attempting to cross above when the ice was getting bad, float down; those animals the natives are very careful to haul on shore, as they prefer such flesh to that killed in any other way."[67]

April 7th. "The women continue to cut up drowned Buffalo to make tallow."

April 18th. "Rain; drowned Buffalo still drifting down the River, but not in such vast numbers as before, many having lodged on the banks and along the beach."[68]

April 25th. "Drowned Buffalo drift down river day and night."[69]

May 1st. "The stench from the vast numbers of drowned Buffalo along the river was intolerable."[70]

May 2nd. "Two hunters arrived . . . from Grandes Fourches. . . . They tell me the number of Buffalo lying along the beach and on the banks above, passes all imagination. They form one continuous line

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[66] Journal, p. 174.
[67] As above, p. 341.
[68] As above, p. 175.
[69] As above, p. 176.
[70] As above, p. 177.

and emit a horrid stench. I am informed that every spring it is about the same."[71]

The distance was 35 miles, and a Buffalo every 10 yards on each side would be within the terms of the description. This would total over 20,000 carcasses.

Dr. E. Coues, commenting on this in a footnote, says:[72]

"This account is not exaggerated. John McDonnell's Journal of May 18, 1795, when he was describing Qu'Appelle River, states, 'Observing a good many carcasses of Buffalo in the river and along the banks, I was taken up the whole day in counting them, and, to my surprise, found I had numbered when we put up at night 7,360, drowned and mired along the river and in it. It is true, in one or two places, I went on shore and walked from one carcass to another where they lay from three to five files deep."[73]

For generations, the dwellers on the Missouri River were familiar with the yearly flood that bore countless Buffalo hulks to be packed away in the Mississippi mud, that in some far, geological day will be rock, all stored and storied with unnumbered bones. Now we know that all the Northern rivers made their death-trap every spring; and, since their sum of dangerous length must have been not less than 20,000 miles, we can form an estimate of the prodigious slaughter that was caused by rotten ice. Clearly, the destruction by Nature's own means was so great that the Buffalo can have done no more than barely hold its own in the fight; and when the rifle also came upon the scene, its doom was sealed.

As I sat in his log museum, up in the mountains during the blizzard of Oct. 30, 1899, Edwin Carter, the naturalist, of Breckenridge, Colo., made a curious observation. He was familiar with the Buffalo in the '60's, and said:

"In my opinion, the Buffalo was a dying race. In their palmiest days, calves were comparatively scarce in the herds, showing that sterilization, the first process of natural extinction, had set in. In the Lost Park herd, calves were rarely seen."

However, I can find no one who agrees with him in this belief. Experience in our Buffalo Parks is a sufficient refutation.

The Buffalo's Age

The solitary bulls, noted later, were probably far over 20 years of age. Domestic bulls continue to breed till considerably over a dozen years old.

[71] Journal, p. 177.
[72] As above, p. 174.
[73] Masson, I, 1889, p. 294.

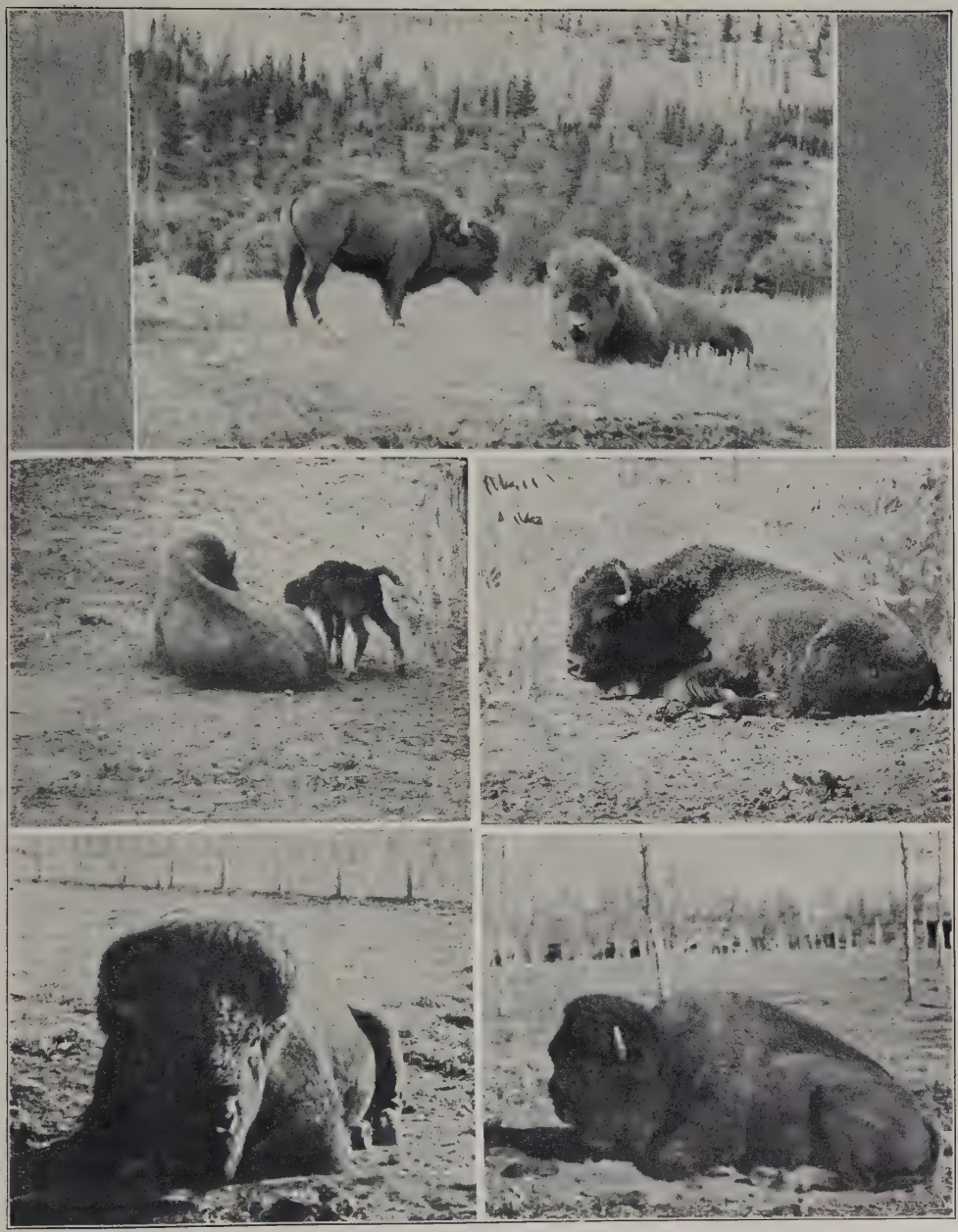

PLATE CIII.—VARIOUS BUFFALO IN ZOO

Photographs by E. T. Seton

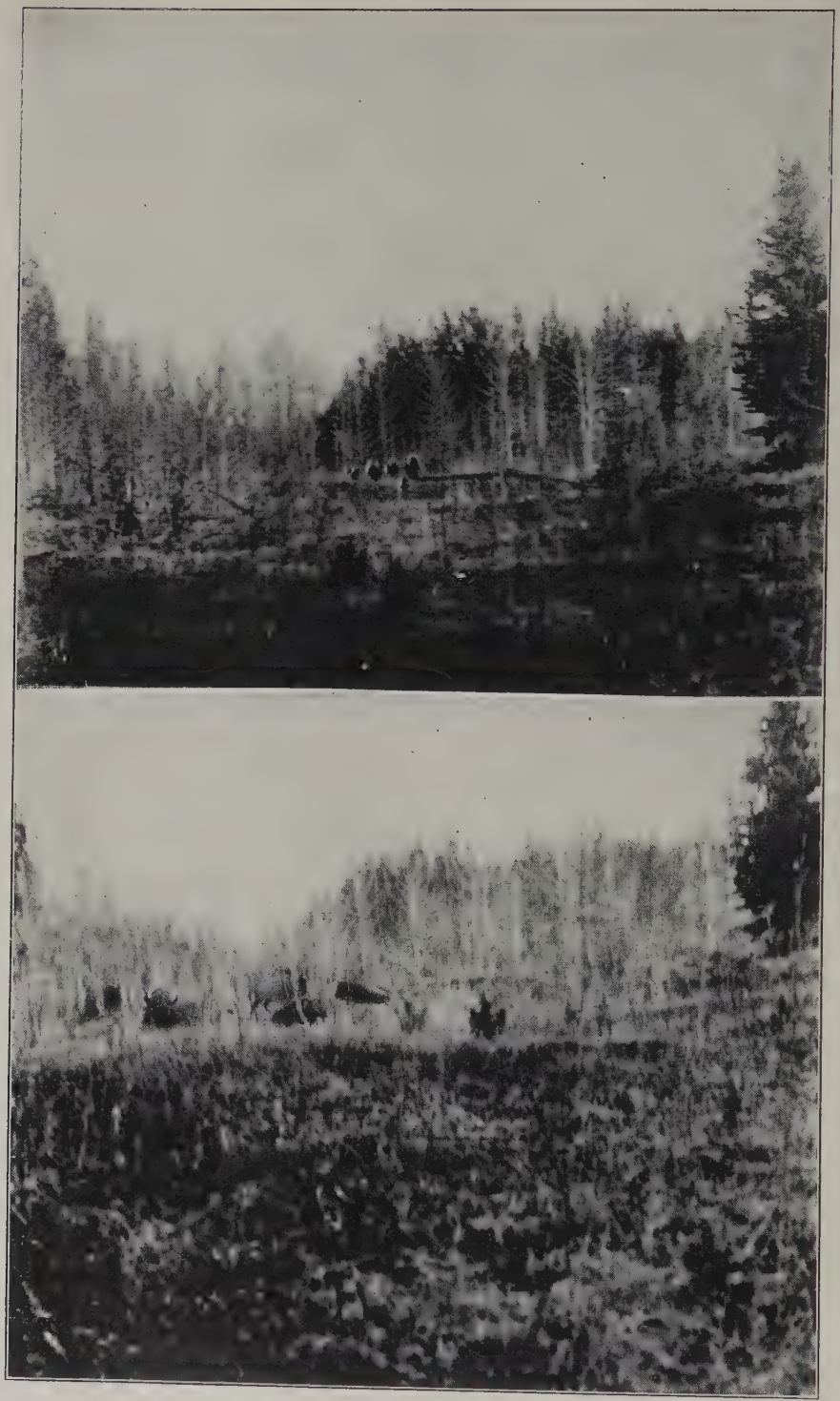

PLATE CIV.—WOOD BUFFALO
Snapshots by E. T. Seton

These were past breeding, and the Buffalo seems to have been longer lived than the ordinary bovine. The Hon. R. F. Pettigrew, of South Dakota, tells me that a Buffalo bull calf that he caught in 1882 was still living in Buffalo City Zoo in 1902; and by its continued vigour gave every promise of a much more extended life.

The cows seem equally long-lived. Charles Payne, of Wichita, tells me of one that was still breeding and vigorous in her twenty-ninth year. Buffalo Jones says: "The natural life of the Buffalo is much longer than is that of domestic Cattle. I frequently saw animals so old, their horns had decayed and dropped off, which indicated that they live to a patriarchal age. I saw a Buffalo cow in the Zoological Garden in Paris which was 31 years old, and I am sure I have seen wild ones from 10 to 15 years older."[74]

Since the cow begins to breed at 3 years, and has a calf each spring (or every other spring) for about 30 years, the diminution of the Buffalo as a wild race, cannot be, as some have claimed, due to infecundity.

Buffalo-birds

In all this pastoral scene, there is a flock of small black birds—"cow-birds" or "buffalo-birds" they are called. They haunt the Buffalo as Negroes do a Mississippi raft-house; sometimes on it, sometimes on the nearest land, but always moving when it moves, and recognizing it as head-quarters.

The cowbird (*Molothrus ater*) is a well-known member of the Blackbird family. It is peculiar in this: it does not pair, make a nest, nor bring up its own young. Free love is its habit; and, when the female is ready to lay, she searches for the nest of some small bird, and in it abandons her offspring to a foundling's chances with a strange foster mother. Then, back she hies her to the merry group that lives and revels around the Buffalo herd.

Sometimes, the cowbirds walk sedately behind their grazing monster; sometimes they flit over, snapping at flies; often they sit in a line along the ridge-pole of his spine. Their attachment to the Buffalo was so close that an Indian myth tells of their nesting in the wool between the horns of the big bull; rather a fearsome home-site, one would think, during combat of the bull with some huge rival. But there are some foundations for the myth. First, they do not nest elsewhere; furthermore, I am told by "old-timers" that skulls of Buffalo, still clad in their black shock of hair, were often used by little birds as nesting places.

One more incident: In the park at Silver Heights, near Winnipeg, is a

[74] Adv., pp. 235–36.

herd of a dozen Buffalo. All summer, they are followed by the usual flock of cowbirds, which fly southward when cold weather arrives. But in the autumn of 1900, one stayed when the others left. All through that Manitoba winter, it remained with the Buffalo, especially with the biggest bull of the herd. Its food was of the Buffalo's food; by day, it flitted near or warmed its toes in the wool of the animal's back; by night, it snuggled on a sort of hollow it had made in the wool just behind his horns. The Buffalo was protector of the bird against famine, frost, and the attacks of both animal and human foes; for he was so fierce that none dared go near him, even to inspect more closely the cowbird that had committed itself to his charge. This incident is attested by Dr. S. J. Thompson, the veterinary of the Province; by George Grieve, the taxidermist; and by T. A. Prescott, the keeper of the zoo.

Grieve tells me that he thinks the bird was wounded, and unable to fly when its kinsfolk went south; and so made the best of the situation. And not so very bad it proved, for it was fat and fit in the spring.

Social Amusement

The only approach to social amusement that I have ever heard of, was that described to me by Charles Norris, a cowboy of New Mexico, who, in 1886, watched a band of Buffalo at their watering place. After drinking very heavily, he says, they played about like calves, and a number of them amused themselves by jumping off a steep bank into the water four feet below, running round to climb the bank at a low place, and repeating the performance many times.

Mating

The Buffalo bull is so exemplary in his behaviour toward the calf that some observers believed the species to be monogamous. Thus Audubon and Bachman say:[75]

"The Bison bulls generally select a mate from among a herd of cows, and do not leave their chosen one until she is about to calve.

"When two or more males fancy the same female, furious battles ensue, and the conqueror leads off the fair cause of the contest, in triumph.

. . . . . .

"It frequently happens that a bull leads off a cow, and remains with her, separated during the season from all others, either male or female."

[75] Q. N. A., II, pp. 37–38.

A fine illustration of the bull's strength and devotion is furnished by Charles Aubrey. He writes:

"My old Indian friend, White-Calf, related an instance of the wonderful strength of the Buffalo bull. While on a journey to war to the South with a large party of Blackfeet, they saw, as they approached the crossing of a river, what looked like a person, showing his head now and then above the bluff bank, as the Buffalo passed near it on their way to water.

"Looking through his spy glass, it was seen to be a Bear lying in wait to kill a Buffalo. The warriors sat down to watch the result. After a time, a cow came along on her way to water, and took the trail close under the bluff where the Bear lay. She was followed by a bull which, however, had for some reason lagged a little behind. The Bear sprang upon the cow, and attempted to drag her down. She cried in alarm and struggled fiercely to shake him off. At her cry, the bull charged; as the cow swung around with the Bear, the bull could not at first attack. But in a moment his chance came. He caught the Bear on his horns under the stomach and tossed him high in air, then caught him on his horns before he struck the ground, and tossed him again. When the Bear struck the ground he was broken down in the hind parts and his entrails were hanging out. He dragged himself away, while the bull made off with the cow."[76]

Other observers deny the existence of any such ideal condition. They maintain that there is no mating, and that the species is promiscuous. Yet others assert that extreme polygamy is the rule—that the strongest bull drives out and holds the herd as his harem. The last theory seems best supported.

Rival Bulls

That great battles take place between rival bulls, there can be no doubt. The annual ferment, the disturber of so much animal peace, sets in during July—earlier in the South, later in the North—and continues for about two months. Catlin's picture is that of a man who had seen it many times:

"The '*running season*,' which is in August and September," he says, "is the time when they congregate into such masses, in some places, as literally to blacken the prairies for miles together. It is no uncommon thing at this season, at these gatherings, to see several thousands in a mass, eddying and wheeling about under a cloud of dust, which is raised by the bulls, as they are pawing in the dirt, or engaged in desperate combats, as they constantly are, plunging and butting at each other in the most furious manner. In these scenes the males are continually following the females, and the whole

[76]Forest & Stream, July 25, 1908, p. 134.

mass are in a constant motion; and all bellowing (or 'roaring') in deep and hollow sounds; which, mingled all together, appear, at the distance of a mile or two, like the sound of distant thunder."[77]

A Battle of Giants

As an illustration of the strength and fighting tenacity of the bull, my friend, Dr. R. M. Simpson, of Winnipeg, furnishes the following: In July, 1906, he was driving a Horse and buckboard on the Winnipeg and Woodland trail. At about 11 A.M., when some 20 miles west of Winnipeg, he saw on the level prairie 2 or 3 miles ahead, what looked like two large dark animals fighting. As he drew near, he found they were a Buffalo bull and a big Shorthorn bull.

They were on their knees, head to head, with horns partly locked; and, judging from the extent of ground torn up, must have been at it for hours. They paid no heed to him as he approached, but continued vigorously charging, fencing, working around, bellowing, and slashing at each other.

Both were gored and ripped around shoulders and flanks, also were frothing and bleeding at the nose, especially the Shorthorn; and yet both seemed full of fight and energy.

Simpson watched them for half an hour, and in all that time the battle continued.

The Doctor then went on to Woodland, where he had luncheon, did some business, and at about 3 P. M., returned, to find the two bulls still at it. Apparently they had never ceased, and were now nearly exhausted. Both had much hair scraped off, and were badly ripped on the sides; and both were bleeding profusely at the nose.

The battle was going on as before, except that they did not bellow now. The rests between attacks were much longer, their breathing was very hard and laboured, and they rested long on their knees with heads together, making occasional feeble passes at each other. It was a very hot day, and they must have suffered terribly from thirst.

They were too much exhausted to trouble him, so the Doctor stood close by and watched them for about an hour, during which time they continued the battle. They were evenly matched, and in this struggle of some six hours, had evidently fought each other to a standstill. Neither would give in, and the Doctor was obliged to leave them at it. The Buffalo seemed, if anything, stronger than the Shorthorn as he drove away. He is not sure of the finish, but has the impression that the Shorthorn was rescued by its

[77] N. A. Ind., I, p. 249.

owner. The Buffalo turned out to be an escape from the Stony Mountain herd, 16 miles north of Winnipeg.

A Finish Fight

Long ago, my old friend, Director Arthur E. Brown, of the Philadelphia Zoo, gave me the story of a finish fight between two big Buffalo bulls in his care. The herd of nearly a dozen was in a large, strong paddock. The boss was a huge brute, but was not a "bad boss"; that is, he did not persecute his underlings. There was a younger bull rising 4, who believed that he could overcome the king, and take his place. There were one or two preliminary skirmishes during the early summer.

Then, one morning in July, the keeper was aroused by the bellowing of combat. The fight was surely on.

By manœuvring, the men got the cows and calves out of the paddock; but the two bulls were fighting furiously, and ignored all attempts to separate them. The battle continued for hours.

Then it seemed that the younger bull had worn the older fellow out. Now the boss tried to escape; and in a state of nature, would have done so. But the high, strong fence was too much for him.

In spite of all that the keepers could do with ropes, lassos, planks, pitchforks, firebrands, blank cartridges, and bales of hay thrown in as buffers, that victorious bull backed up to one side, and charged the full width of the enclosure, with all his 2,000 pounds of fury, to drive his horns deep into his helpless, plunging, moaning foe. Again he backed; and again, with the frightful impact of a charge, impaled him; and again and again, with remorseless rage, till the poor, old king lay dead against the fence—a shocking mass of broken bones and gory flesh, pierced in a hundred places, and belching the last of his blood on the red and torn-up ground.

The Lone Bull

In the Buffalo days, the Lone Bull was a familiar figure on the landscape. Whenever, far, far away, the eye caught the black spot that meant a Buffalo, with no other black spots near, all the wise folk knew that it was a lone bull —a tough, old outcast, of no interest to those who sought for meat.

Since the range Cattle have replaced the Buffalo, the lone bull of the new species is as conspicuous as ever. It is the same among the wild Cattle of Chillingham Park, England. It is the same among the Muskoxen; and probably the same among all the bovine kinds. Who is he? Why always alone?

PLATE CI.—EARLIEST KNOWN PICTURE OF AMERICAN BUFFALO

From Gomara's Historia de las Indias Saragossa, 1552-1553. Folio.
In New York Public Library (Lenox Building)

Cattalo yearling in herd of Buffalo Jones

From pen sketch by E. T. Seton
(Courtesy of the United States National Museum)

Cattalo cow in herd of Buffalo Jones

From pen-and-ink sketch by E. T. Seton
(Courtesy of the United States National Museum)

A story of the plains

The big bull collected by W. T. Hornaday

From pen-and-ink sketch by E. T. Seton
(Courtesy of the United States National Museum.)

PLATE CII.—PEN DRAWINGS OF BUFFALO, ETC.

We find the answer clearly set forth on noting the life and politics of a Buffalo herd that has been under close observation.

In Salt Lake, Utah, is Antelope Island, about 50 square miles in extent. In 1905, the Buffalo on it numbered 28. Friends in Salt Lake City have given me an idea of what has been going on in that herd, ever since they were turned loose and left free to resume their tribal life, a dozen years ago. The strongest bull takes possession of all the best things—the wallow, the choice food, the shady spot in summer, the sheltered nook in winter, and the majority of the cows. He would take all, if he had the wit, and if the cows accepted his view of the matter. The lesser bulls keep out of his way, and take what they can get of his leavings.

From time to time, some growing, lusty, young fellow tries a bout with the "boss," and usually gets the worst of it. But a time comes, soon or late, when the "boss is licked." He is driven out of the herd, and far away from it; forbidden to return at the peril of his life. And the new king reigns in his stead, to tyrannize over the cows and the lesser bulls, even as the old king had done before.

The reign of each "boss" is usually three or four years; that is, from about his fourth to his eighth year. I have no doubt that this explains the clan life of the Buffalo. It is a well-known fact, as we have learned, that any solitary Buffalo seen on the Plains was always an outcast old bull, doubtless one that originally had been driven out of the herd; and, becoming indifferent to the other sex, remained more or less solitary from choice.

These old bulls are rarely molested by hunters, human or brute. They are too tough for the one to eat, or for the other to kill. But sometimes the Wolves, when hard pressed by hunger, will unite in a large band, and attack even an old bull, if no better prey be in sight. Catlin was witness of several of these terrific encounters, and has left this description:[78]

"During my travels in these regions, I have several times come across such a gang of these animals [Wolves] surrounding an old or a wounded bull; where it would seem, from appearances, that they had been for several days in attendance, and at intervals desperately engaged in the effort to take his life. But a short time since, as one of my hunting companions and myself were returning to our encampment, with our Horses loaded with meat, we discovered, at a distance, a huge bull encircled with a gang of White Wolves. We rode up as near as we could without driving them away, and, being within pistol shot, we had a remarkably good view, and where I sat for a few moments and made a sketch in my notebook, after which we rode up and gave the signal for them to disperse, which they instantly did,

[78]N. A. Ind., I, pp. 257–58.

withdrawing themselves to the distance of fifty or sixty rods, when we found, to our great surprise, that the animal had made desperate resistance until his eyes were entirely eaten out of his head, the grizzle of his nose was mostly gone, his tongue was half eaten off, and the skin and flesh of his legs torn almost literally into strings.

"In this tattered and torn condition, the poor old veteran stood bracing up in the midst of his devourers, who had ceased hostilities for a few minutes, to enjoy a sort of parley, recovering strength and preparing to resume the attack in a few moments again. In this group, some were reclining to gain breath, whilst others were sneaking about and licking their chaps in anxiety for a renewal of the attack; and others, less lucky, had been crushed to death by the feet or the horns of the bull.

"I rode nearer to the pitiable object as he stood bleeding and trembling before me, and said to him, 'Now is your time, old fellow, and you had better be off.' Though blind and nearly destroyed, there seemed evidently to be a recognition of a friend in me, as he straightened up; and, trembling with excitement, dashed off at full speed upon the prairie, in a straight line. We turned our Horses and resumed our march; and when we had advanced a mile or more, we looked back, and on our left, where we saw again the ill-fated animal surrounded by his tormentors, to whose insatiable voracity he unquestionably soon fell a victim."

Fremont has given us a thrilling description of the treatment accorded an old bull by his younger, stronger relatives, He says in the narrative of his famous journey across the Plains:[79]

July 7, 1842. "In the course of the afternoon, dust rising among the hills at a particular place, attracted our attention; and, riding up, we found a band of 18 or 20 Buffalo bulls engaged in a desperate fight. Though butting and goring were bestowed liberally, and without distinction, yet their efforts were evidently directed against one—a huge, gaunt, old bull, very lean, while his adversaries were all fat and in good order. He appeared very weak, and had already received some wounds, and, while we were looking on, was several times knocked down and badly hurt, and a very few moments would have put an end to him. Of course we took the side of the weaker party, and attacked the herd; but they were so blind with rage that they fought on, utterly regardless of our presence, although on foot and on horseback we were firing in open view within twenty yards of them.

"But this did not last long. In a very few seconds we created a commotion among them. One or two, which were knocked over by the balls, jumped up, ran off into the hills; and they began to retreat slowly along a

[79]Expl. Exped., p. 26.

broad ravine to the river, fighting furiously as they went. By the time they had reached the bottom, we had pretty well dispersed them, and the old bull hobbled off to lie down somewhere."

The question arises, Who was that old bull? I suspect that he was the great-grandfather of many of those who were ill-treating him, and further, that he ill-treated his own great-grandfather in precisely the same way.

The Great Bands

It was during the migrations only that the very large herds were seen. Bands of a few thousand were found at all seasons, but the millions came together only on some great general impulse.

Let us follow one of the herds moving northward to its summer home from the sheltered bottom-lands along the Missouri, in central Dakota, where it has wintered.

Before there is yet any visible spring in the land, the spirit of unrest comes on the animals. It may be that the final touch is given by a warm, sunny day. Some old cow, with a bunch of from 50 to 100 followers, turns her nose northward. Their grunting spreads an epidemic of unrest; and from every valley, a long, black stream pours forth. As they top the uplands, others and yet others come to view. The general move is northward, but their disposition is to condense into one herd.

As night comes down, black and chill, they leave the exposed ridges, and shelter in the hollows. Cold weather and more snow may follow, but the impulse to travel possesses them now. Once it is given command, it changes not in force or direction, till the remembered pastures are reached. Rivers may cross their path. These, if frozen, are unnoticed; if open, they are swum; if covered with rotten ice, the ice is broken eventually by the weight of the herd. Many are drowned, but the rest swim through and continue their march. An onset of hunters may swerve them for a time, but it does not change their main trend.

For three or four weeks this continues, and the blackening horde comes swarming down the long, level prairies of the Red River Valley. Now they are nearing their familiar summer haunts, and the bands which united originally to form the herd, begin to go their separate ways. Here, again, some old leader cow sets the example; and, stringing after her, come many cows and yearlings, mostly relatives by marriage or descent.

The Matriarch and Her Clan

In a broad sense, it will be seen that this small local herd is a family—or rather a clan. These general principles will be found applying, and they

explain the clan life as well as the clan continuity. Their leader is always an old cow—there is abundance of evidence for this—doubtless she is the grandmother of many of them. As Long says:[80] "Cows are often seen accompanied by the calves of three seasons."

The males remain with the females, and take an active interest in the young. Buffaloes, like all sociable animals, know and stay with their personal acquaintances; they resent the approach of strangers; migrants work back to their birthplace. Whenever a local band of Buffalo has been wiped out, their pasturage has remained vacant for years; so it is unlikely that this group is finally scattered during the annual herding. The evidence derived from common range Cattle sustains this idea; for, in spite of the annual round-ups which correspond to the annual herding of the Buffalo, we usually find the same little bunch of Cattle (easily distinguishable by their marks) on the same feeding ground, season after season. Finally, the Bison is usually polygamous, or sometimes promiscuous; so that those living together are sure to be much interrelated.

The blood-and-clan feeling of the group, therefore, I think well established; but, because it has been questioned, I was glad, long after the above was written, to find the following penned by an undoubted authority, Buffalo Jones:[81]

"Each small group is of the same strain of blood. There is no animal in the world more clannish than the Buffalo. The male calf follows the mother until two years old, when he is driven out of the herd, and the parental tie is then entirely broken. The female calf fares better, as she is permitted to stay with her mother's family for life, unless by some accident she becomes separated from the group.

"The resemblance of each individual of a family is very striking; while the difference between families is as apparent to the practised eye as is the Caucasian from the Mongolian race of people.

"These groups are as quickly separated from the great herd after a stampede as is a company of soldiers from its regiment at the close of 'dress parade.' The several animals know each other by scent and sound; they grunt similarly to a Hog, but in a much stronger tone, and are quickly recognized by every member of the family. When separated by a stampede or other cause, they never rest until they are all together again.

"A pathetic sight was sometimes witnessed when the mother of one of these families was killed at the first shot. They were so devoted to her, they would linger and wait until the last one could be easily slain."

[80]Exped. Rocky Mts., p. 473.

[81]Adv., p. 234.

So far as I can learn, the clan separates from the herd, but does not further disintegrate. It rambles about, in a radius of perhaps ten miles from its favourite drinking place; and, wherever it goes, it is followed by one or two ever watchful Gray-wolves—the parasites of that particular clan.

Mother—and Bearing Time

Some time in April, usually, though possibly as early as January and as late as August, the full-grown cow has finished her $9\frac{1}{2}$ months' gestation. True to a universal instinct, she slinks off by herself to some slight hollow—for such there are even on the levellest prairie—and there is born the calf, or, on some rare occasions, twins.

The labour is remarkably short and easy. Dr. Frank Baker, of the National Zoo, writes me that normally it occupies from 25 to 45 minutes. A recent case in that Park was timed by the head keeper, W. H. Blackburne, who says that "the calf had been cleaned, and was nursing, 26 minutes after the cow stopped eating hay and lay down." Thus, in less than an hour, the mother is able and ready to meet any enemy that may come to injure her young.

From one or two Wolves, she is very well able to guard the calf; but half-a-dozen give a serious aspect to the situation, even though she stand with the little one under her body. Usually, however, help is at hand. Her loud, angry snort or threatening bellow will quickly bring the bulls to her aid. And the effectiveness of their response may be judged by the incident related below by Dodge.

Once the calf is strong on its feet—and that means when three or four days old—its life is with the herd, and it is effectually guarded. Ordinarily, when the old ones lie down for the night, they may be scattered; but the near appearance of their tireless, omnipresent enemy, the Gray-wolf, is enough to make them rearrange their places, condensing their band; the bulls, as a matter of course, now taking the outside.

Charles Aubrey, the old Buffalo-hunter, says:

"In calling her young, the Buffalo mother does not make the bawling cry of the domestic cow, but gives out a peculiar muttering, grunting sound, the calf answering in much the same manner. This was often to be heard when a wide river was to be crossed.

"If all was quiet, and there was no cause to hurry, the mother in swimming kept her calf on the upstream side. When the calf grew tired, if small, it often climbed on the back of its mother, and in that way she would ferry her young across swift-rushing rivers.

"The Buffalo cow gives a rather limited quantity of milk, but its quality is very rich. To the Indian hunter, the bag of a cow with calf was a great delicacy, for it was rich in fatty oils."[82]

Father and Little One

An army surgeon related to Colonel Dodge the following delightful incident:[83]

"He was one evening returning to camp after a day's hunt, when his attention was attracted by the curious action of a little knot of 6 or 8 Buffalo. Approaching sufficiently near to see clearly, he discovered that this little knot were all bulls, standing in a close circle with their heads outwards, while in a concentric circle at some 12 or 15 paces distant, sat, licking their chaps in impatient expectancy, at least a dozen large Gray-wolves (excepting man, the most dangerous enemy of the Buffalo).

"The doctor determined to watch the performance. After a few moments, the knot broke up; and, still keeping in a compact mass, started on a trot for the main herd, some half a mile off. To his very great astonishment, the doctor now saw that the central and controlling figure of this mass was a poor little calf, so newly born as scarcely to be able to walk. After going 50 to 100 paces the calf lay down, the bulls disposed themselves in a circle as before; and the Wolves who had trotted along on each side of their retreating supper, sat down and licked their chaps again; and though the doctor did not see the finale, it being late and the camp distant, he had no doubt that the noble fathers did their whole duty by their offspring, and carried it safely to the herd."

Fremont records a similar incident that he observed on the Platte River in 1842. In this case, however, the Wolves were too numerous for the would-be rescuer, and the affair had a tragic end:

July 4. "While we were at breakfast," he says,[84] "a Buffalo calf broke through the camp, followed by a couple of Wolves. In its fright it had probably mistaken us for a band of Buffalo. The Wolves were obliged to make a circuit around the camp, so that the calf got a little the start, and strained every nerve to reach a large herd at the foot of the hills, about 2 miles distant; but first one, and then another, and another Wolf joined in the chase, until his pursuers amounted to 20 or 30, and they ran him down before he could reach his friends. There were a few bulls near the place,

[82]Forest & Stream, July 25, 1908, p.133.
[83]Hunting Grounds, p. 125.
[84]Expl. Exped., p. 22.

and one of them attacked the Wolves and tried to rescue him; but was driven off immediately, and the little animal fell an easy prey, half devoured before he was dead. We watched the chase with the interest always felt for the weak; and had there been a saddled Horse at hand, he would have fared better."

Family Life

In both cases, the mother seemed to be missing. Some observers think her negligent of her duties. There is, indeed, great individual variation in this respect; but, ordinarily, she is the best protector the little one can have, and is afraid of nothing when the calf is threatened. Yet many times she acts in a dumb, cowed way, especially when the assailant of the youngster is a man.

James K. Darnell, of Breckenridge, Colo., related to me that in the early '70's, when he was cow-punching on the Plains, the Buffalo were very plentiful. He often amused himself by roping the calves. When one was caught, he would jump off, remove the lasso, and hold it with his hands. The mother would stand at a distance of 100 yards gazing anxiously, neither cow nor calf making any sound. As soon as he let the calf go, the mother, seeing it was free, knew it would take care of itself, and turning tail, went off at full gallop, without even looking behind.

Had the calf, by bellowing, made it clear to his mother that he was in peril of his life, I fancy it would have made a profound change in her demeanour.

In proof of this is an experience recorded by Buffalo Jones,[85] while on his last expedition to capture Buffalo alive. It shows that the cow Buffalo is no respecter of persons when once her dull wit has grasped the idea that they are unworthy of respect. When the last calf was lassoed, its mother rushed furiously to the rescue. After vainly trying to drive her off, Colonel Jones very unwillingly drew his revolver and shot her dead.

Nor does the maternal instinct suffer when the animal is tamed, and taught less distrust of man, as Jones expressly says:[86]

"Sometimes when I now lasso a calf of those in domestication and attempt to lead it away, the mother will quickly place herself in front of her baby, and thrust a horn under and often through the loop of the rope, and hold the Horse and rider perfectly solid, while, if the rope is slackened, she in some instances will free the calf entirely."

We have seen that the mother, and all the possible fathers and uncles,

[85] Forty Years, p. 135.

[86] As above, p. 235.

are ready to do their duty in protecting the calf. Now comes Buffalo Jones to attest that the aunts also are quick to respond. Thus the ideal of family feeling is complete in the Buffalo, setting him in high and honourable contrast to most other polygamous animals; offering, indeed, some refutation to the dictum that such a marriage arrangement is a foredoomed failure.

"Often," says Colonel Jones,[87] "have I so crippled a calf that it was impossible for it to follow the herd, and its pitiful bleating would hold the family until I could kill all desired. Should the calf be wounded in the fore or hind parts, the old cow would actually support the parts so crippled, and it would walk away on the normal parts by such aid."

"In pursuing a large herd of Buffaloes," says Catlin,[88] "at the season when their calves are but a few weeks old, I have often been exceedingly amused with the curious manœuvres of these shy little things. Amidst the thundering confusion of a throng of several hundreds or several thousands of these animals, there will be many of the calves that lose sight of their dams; and being left behind by the throng, and the swift passing hunters, they endeavour to secrete themselves, when they are exceedingly put to it on a level prairie, where nought can be seen but the short grass of six or eight inches in height, save an occasional bunch of wild sage a few inches higher, to which the poor affrighted things will run; and dropping on their knees, will push their noses under it, and into the grass, where they will stand for hours with their eyes shut, imagining themselves securely hid, whilst they are standing up quite straight upon their hind feet and can easily be seen at several miles distance.

"It is a familiar amusement for us, accustomed to these scenes, to retreat back over the ground where we have just escorted the herd, and approach these little trembling things, which stubbornly maintain their positions with their noses pushed under the grass, and their eyes strained upon us, as we dismount from our Horses, and are passing around them. From this fixed position, they are sure not to move, until hands are laid upon them, and then for the shins of a novice we can extend our sympathy; or if he can preserve the skin on his bones from the furious buttings of its head, we know how to congratulate him on his signal success and good luck.

"In these desperate struggles, for a moment the little thing is conquered, and makes no further resistance. And I have often, in concurrence with a known custom of the country, held my hands over the eyes of the calf, and breathed a few strong breaths into its nostrils; after which I have, with my hunting companions, ridden several miles into our encampment, with the little

[87] Forty Years, pp. 234–35.
[88] N. A. Ind., I, p. 255.

prisoner busily following the heels of my Horse the whole way, as closely and as affectionately as its instinct would attach it to the company of its dam."

Alex. Henry mentions expressly that the mothers come back in search of their young after the hunt is over.[89]

The Growing Calf

As the calf grows to strength and vigour, he is well able to care for himself; and the mother's gentleness gives place to firmer methods.

I remember once watching a young calf that besought his mother for food, by pushing her neck as she lay. She brushed him away with a swing of her head. He tried farther back, where, indeed, he could smell the refreshment that he needed; but it was effectively barricaded from him. Again he rubbed and leaned against his mother's neck in mute appeal; again she mutely said, "Don't bother me," and flung him afar with a swing of her massive woolly jowl.

Then did that small calf rise to the emergency in a way that filled me with glee; for, standing just beyond the sweep of mother's impatient horns, he backed and charged again and again, butting and pounding, with his tiny, budding "nubbins" of horns, against her flank—her only tender spot—until she could stand it no longer, and leaped to her feet. Now, of course, the object he had in view was easily within his reach; and springing into place, but well forward out of reach of her first impatient but half-hearted kick, he tugged away. The mother's love was stirred in response, and her forgiveness of him was complete—it arrived, indeed, before his punishment, so that the latter came not at all.

Another glimpse of the family life, or at least, the Indian opinion of it, is afforded by the following from the pen of C. E. Denny. Referring to the rare and beautiful "Silk or Beaver robe" already mentioned, he says:

"The robe was nearly always of a cow, very fine and very light. Many explanations were given by the hunters for this peculiar coat, and the right one was no doubt that given by Montana Indians—that it was caused by the constant licking of many animals in the herd, to which some motherless calf belonged, it having become the pet of the band, the animals testifying their liking in that manner."[90]

Charles Aubrey, the old trader, says that in trading many thousands of Buffalo robes, "I have handled but three silk robes."[91]

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[89] Journal, p. 177.

[90] Forest & Stream, May 8, 1897, p. 362.

[91] As above, July 25, 1908, p. 134.

Springtime

In the early spring, the life of the herd is pleasant. Weather is bright and warm; insect pests are unknown. Before the snow is quite gone, the crocus or sandflower is greening the Plains again, and in a week changing their colour with its teeming bloom; a hundred others follow in quick succession with their rich and succulent growth.

The Buffalo grow fatter every day. All the early morning they graze. Toward ten o'clock, they lie down and chew their cud; about noon, the old cow will arise and march toward the water with the band behind her. She does not go far among the many deep-worn Buffalo trails, before finding one which is headed her way. She follows it; the others come stringing along Indian-file behind her. The only exception to the single line is made by the calves, which frisk along beside their mothers. It may be miles to the watering place, but the herd marches steadily, and with purpose.

After all have drunk their fill, they may lie down again in the neighbourhood, or maybe they will wander back to some prairie swell, on whose northern side the sun is a little less warm, or the western breeze a little stronger. There they scatter, and lie down for a two-hours' rest, till the herd is reminded of its own growing hunger, perhaps by some young "spike-horn" rising to resume the quest for food. Or, maybe, the final ounce of push that moves the landslide is supplied even by some little calf, who, desiring drink, uses vigorous means to make his mother take the posture needful to serve him.

When the Plains Are Brown

During August and September, the herd has consisted of all ages and sexes intermixed. As September wanes, the males lose interest in their partners; and now, for the first time we find the clan divided—the males in one herd, the females in another. Their lives go on as before, but they meet and pass without mixing.

The bulls have just gone through the stress time of rut and battle. They are now poor in flesh, and subdued in spirit; but the rich pasturage to which they most assiduously devote themselves begins to improve their condition. By October, the good fare shows in all. Their new growing coats are sleek, their bodies reinvigorated, their tempers more sociable; and, when late November frosts send forth the word to move, it is usual to find the clan reunited, drifting as before with the old great-grandmother in advance; the young ones scattered through it, the father and grandfather behind; and the dethroned great-great-great-grandfather roaming alone in the offing.

The Passing of the Buffalo

Many able pens have recorded the service this imposing creature rendered man. It needs no telling here. He fed a quarter of a million, and clothed twice as many human beings. But these services are ended. As a wild animal, the Buffalo is gone! The great herds will never again be seen roaming the Plains.

Who is there of the present generation that does not feel profound regret at this thought, and ask himself, "Oh, why was I born too late?" What would I not give to have seen the Buffalo days and Buffalo people in their romantic prime? Much of the hungry regret that Sir Walter Scott felt over the departed glories of feudal life, is felt by every boy and young man of our country now, when he hears of the Buffalo days and the stirring times of the bygone wildest West.

Why was this extermination allowed? Why did not the Government act? This and a hundred other saddest "might-have-beens," spring forth from hearts that truly feel they lost a wonderful something, when butchers, drawn from the human dregs of border towns, were turned loose to wipe out the great herds that meant so much to all who love the wilds and the primitive life.

There is but one answer: *It was absolutely inevitable.* The Buffalo ranged the Plains that were needed by the outcrowded human swarms of Europe. Producing Buffalo was not the best use to which those plains could be put. The Buffalo, possessed of vast size and strength, of an obstinate, impetuous disposition, that would stampede in a given line and keep that line to the utter destruction of all obstacles or of himself, was incompatible with any degree of possession by white men, and with the higher productivity of the soil. Therefore, he had to go.

He may still exist in small herds in our parks and forest reserves. He may even achieve success as a domestic animal, filling the gaps where the old-time Cattle fail. But the Buffalo of the wild Plains is gone for ever; and we who see those times in the glamour of romance can only bow the head and sadly say, "It had to be. He served his time, but now his time is past."

His Monument

But he leaves behind him a lasting monument. Who that knows the West has not seen the game-trail grow into an Indian trail; the Indian trail into a pack-trail; the pack-trail into a white-man's road, that in turn is the pilot of the iron horse? The reason is simple—it is the easiest and shortest way through the hills that can be selected by long experience, and thor-

ough knowledge of the country. This idea has been worked out for the Buffalo by A. B. Hulbert in his "Historic Highways of America."[92] He points out that the Buffalo first planned the route through the Alleghanies by which the white man entered, and possessed the Mississippi Valley.

"It is very wonderful (he says) that the Buffalo's instinct should have found the very best courses across a continent upon whose thousand rivers such great black forests were thickly strung. Yet it did, as the tripod of the white man has proved; and . . . human intercourse will move largely on paths first marked by the Buffalo. It is interesting that he found the strategic passageways through the mountains . . . it is also interesting that the Buffalo marked out the most practical portage paths between the heads of our rivers, paths that are closely followed to-day, for instance, by the Pennsylvania, Baltimore and Ohio . . . Chesapeake and Ohio . . . Cleveland Terminal and Valley . . . and the Wabash Railway. . . .

"A rare instance of this is the course of the Baltimore and Ohio Railroad between Grafton and Parkersburg in West Virginia. . . . The railway has followed the trail steadily throughout its course, and when it came to a more difficult point than usual, where the railway is compelled to tunnel at the strategic point of least elevation, in two instances the trail runs *exactly over the tunnel!*"

But the white man was not the first to follow the Buffalo's paths. Professor James Mooney, of the Smithsonian Institution, has proved to us that the Sioux Indians were a race of the Atlantic Coast; that they migrated through the Alleghanies to the Mississippi Valley; and on—and yet farther on—they went. Doing what? We know to-day from their traditions, from their life, and from their route, they were *following the Buffalo.* They followed them over the mountains, by the paths the Buffaloes themselves had made. They have followed them long and far. Will they keep on, and—as many of their bravest wished to do—seek the herds no more on the vast Missourian Plains, but over the borderland, in those perfect hunting grounds where the mosquito, the smallpox, and the white man are unknown, and where alone the Buffalo bands will ever again be seen darkening the offing and "making the earth one robe"?

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[92]Prospectus to Hist. Highways Amer., Vol. I, Part II. Paths of the Great Game Animals, 1902. p. 20.

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LIFE LX—WOOD BUFFALO

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PEACE RIVER

Wood Buffalo, Wood Bison, Woodland Bison, American Aurochs

Bison bison athabascæ Rhoads

(L. *Bison*, see *ante; athabascæ*, of Athabaska)

Bison bison athabascæ Rhoads, 1898, Proc. Acad. Nat. Sci., Phila., p. 498.

Type Locality—Within 50 miles, southwest of Fort Resolution, Mackenzie.

Cree & Ojibway, *Ah-thuk-ard Moos-toosh.*
Chipewyan, *Ed-jer-ay.*

"*General Characters.* Size larger, colours darker, horns slenderer, much longer and more incurved, and hair more dense and silky than in *B. bison.*

"Description of type specimen from data furnished by Professors J. Macoun and H. A. Ward; Pelage everywhere dense and silky; short and fine over much of hinder part of body, becoming very dense and curly and long anteriorly, especially on shoulders and neck, and also quite long on the frontal aspect. Colour along crest of hump and vertebral line to rump 'light brown,' shading in all directions to darker brown and becoming almost black on the whole head, legs and belly. 'Looking at head and legs you would say at once they were black.' Ears, muzzle, hoofs and horns and distal half of tail black.

"Horns (on mounted skin) very long and strongly recurved. 'Curved inward so as to come towards the eye within 2 inches of the line of the base'; nearly semicircular in exterior outline, but more abruptly incurved along terminal third. Horn-cores of detached skull strongly curved, directed at base 'slightly downward' below frontal plane; 'then outward and upward, the tips slightly incurved, the general direction of core being slightly backward; a line drawn from middle of orbit to tip of core intersecting base of core higher than in *Bison bison.*' Horn-cores nearly circular in section at base, becoming slightly flattened above, medially, 'with an obscure ridge below.'

"Measurements.—(Sent by collector with skin to Prof. Frank A. Ward.) 'Height at shoulders, 1,703 mm. (5 ft. 7¼ in.); height to rump just

in front of hind legs, 1,602 mm. (5 ft. $3\frac{1}{4}$ in.); total length of head and body, without tail 2,846 mm. (9 ft. $4\frac{1}{4}$ in.)'"[1]

Rhoads also remarks (p. 499) that "In the type, the frontal breadth between the bases of horn-cores is . . . more than 50 mm. wider than the largest old male skull of *B. bison* in the Museum of the Academy of Natural Sciences of Philadelphia."

On May 29, 1914, I visited the Calgary Museum, and examined the Radford bull. It is about 6 feet at the withers, has no mane, no beard, no "chaps." But the hair all over the body is long and curly. It has immense horns, long and curved, is of enormous bulk, evidently larger than any Plains Buffalo, and much like an Aurochs. It weighed 2,460 pounds, or 2,402 pounds after bleeding. The skeleton is in the National Museum at Washington.

The longest horns of this Buffalo recorded in Rowland Ward's Book (1922, p. 428) are in the American National Collection, and measure as follows: Length, $18\frac{3}{4}$ in.; girth, 15 in.; tip to tip, $27\frac{1}{2}$ in. (owner's measurements).

History

The earliest chronicler of the Wood Buffalo was Samuel Hearne. In his Journal for Jan. 9, 1772, he describes his crossing of the Athapuscow Lake (Athabaska) to the level wooded country of the south side. Here, he says: "Buffalo, Moose and Bear were very plentiful. . . .

"The Buffalo in those parts, I think, are in general much larger than the English black Cattle; particularly the bulls, which, though they may not in reality be taller than the largest size of the English Oxen, yet to me always appeared to be much larger. . . . The horns are short, black, and almost straight, but very thick at the roots or base.

"The head of an old bull is of a great size and weight indeed: some which I have seen were so large, that I could not without difficulty lift them from the ground. . . .

"The hair of the body is soft and curled, somewhat approaching to wool; it is generally of a sandy brown, and of an equal length and thickness all over the body: but on the head and neck it is much longer than it is on any other part."[2]

In addition to this, he gives many details of its habits, etc.

So far as his narrative shows, Mackenzie did not see any Buffalo on his voyage from Chipewyan to the mouth of the Mackenzie River in 1792.

[1] Rhoads, pp. 498–99.

[2] Journey, pp. 250–52.

His Indian friends told him that there were herds of Buffalo in the woods back from the Slave River; but these, apparently, he never saw. On his return, he set out from Fort Chipewyan up the Peace River. He left Oct. 10th, of that year, and travelled till Nov. 1st., when he was at the Forks of the Peace (lat. 56° 9′ N., long. 117° 35′ 15″ W.); here he wintered. On the 19th of October, when at the Old Establishment on Peace River, he referred to the "very extensive plains, which afford pasture to numerous herds of Buffaloes."[3] In December, when at the Forks of the Peace, he says: "On either side of the river, though invisible from it, are extensive plains, which abound in Buffaloes, Elks, Wolves, Foxes, and Bears."[4] However, apparently, *he did not see any* till the May following, when he left his winter camp, and travelled westward. Thenceforth, the Buffalo seemed to be a daily sight; and, referring to the great valley of the Peace after it left the Rockies, he says:

"This magnificent theatre of nature has all the decorations which the trees and animals of the country can afford it: groves of poplars in every shape vary the scene; and their intervals are enlivened with vast herds of Elks and Buffaloes; the former choosing the steeps and uplands, and the latter preferring the plains."[5]

Mackenzie did not distinguish the Wood Buffalo from those of the Plains. Richardson, also, writing in 1829, after spending several seasons in the country, treats Plains and Wood Buffalo as the same, although he records the fact that the Wood Buffalo are said to be "of a greater size."[6]

Henry Y. Hind says: "The skin of the so-called Wood Buffalo, of which I saw two at Red River, is much larger than that of the common animal. The hair is very short, mane or hair about the neck short and soft, and altogether destitute of curl, which is the common feature in the hair of the prairie animal."[7]

Dr. J. A. Allen, in his monograph on the Common Bison or Buffalo, Hayden Survey, 1875 (pub. 1877), p. 447, discusses, without pronouncing on, the distinctions between the Wood Buffalo, the Plains Buffalo, and the Mountain Buffalo.

In 1884, when living in the Northwest, I heard much about the Wood Buffalo, and got some detailed information from Elzear Mignault, a French trader who had lived for ten years on Peace River. This I embodied in a

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[3]Voyages from Montreal, 1801, p. 125.

[4]As above, p. 130.

[5]As above, pp. 154–55.

[6]Fauna Boreali Americana, I, p. 282.

[7]Assiniboine & Saskatchewan Exploring Expedition, 1859, p. 105.

paper on the "Ruminants of the Northwest," 1885, and published in the Proceedings of the Canadian Institute, 1886, pp. 114–17; also in the Winnipeg *Free Press* for May 27, 1886, and in the first edition of my "Mammals of Manitoba," 1886. A part of this I reproduce:

"Mignault maintains with the Indians that it is distinct urging also in support of his opinion that the only Prairie Buffalo ever seen in the valley was killed in 1866. It was a solitary mangy bull, a complete outcast which would probably not have been the case had the Wood Buffalo been his immediate kindred. All my informants agree that the Wood Buffalo differs from its prairie relative, in being much larger and considerably darker in colour. Mignault adds that its legs are proportionately shorter, its horns less robust and more curved inwards, its hair, shorter, finer, entirely without curl, and all over of a very dark brown, almost a black in winter, but in the summer assuming a hue not unlike that of the prairie animal.

"The two forms are not distinguished on the books of the Hudson's Bay Company. . . .

. . . . . .

"When in 1875 Mignault left the Peace River, the Wood Buffalo were plentiful in the country between Dunvegan and Great Slave Lake, and the Liard and Athabaska rivers. In 1884 he heard from a comrade that they were then still common.

"The Indians, he said, call it *Ah-thuk-ard Moos-toosh*, and consider it quite distinct from the Prairie Buffalo, which they call *Mas-kootay Moos-toosh*.

"Its general habits differ a good deal from those of its prairie relative, rather resembling those of the Moose; although it is much less wary and difficult of approach than that animal.

"It is rarely found in herds, except in the fall. The greatest number my informant ever saw together in the summer was 3. These were going down to the river as he rounded a point in a barge. As soon as he came in view, they scrambled up the bank and disappeared in the woods.

"But in the month of August, the mating season, they are inclined to gather into straggling bands of both sexes and go roaming about the woods, which are made to resound with the thud and trampling of the males engaged in battle.

"During the winter, they confine themselves to heaviest and densest timber, subsisting on willow scrub, moss and such dry grass as is attainable, especially the long, coarse grasses of the sloughs.

"In the summer, they are so much persecuted by the 'bull-dog' flies

that during the warm weather, they spend the greater part of the day immersed to the eyes in some river, lake or mud-hole; and it is not uncommon for the voyageur who silently rounds some point on the Liard, Salt or Peace rivers to observe protruding from the water the black head of the fly-persecuted Buffalo. Under these circumstances the animal usually gazes stupidly for an instant, then suddenly bestirring itself, it dashes to the shore and disappears in the woods.

"They usually seek the thick swamps from preference, though they distinguish and avoid the treacherous bogs or muskegs, which are found in various parts of the country. They commonly feed during the night, as this is the only season when they are free from the torment of the gadflies. It is for similar reasons that they usually confine themselves to the dense woods in summer, for when the day chances to be cold and windy so that not a fly is to be seen, they take advantage of the opportunity to climb about even the high rocky hills."

In 1890, Warburton Pike hunted in the land of the Wood Buffalo, and secured a female specimen in February of that year. He wrote: "These animals go by the name of Wood Buffalo; and most people are of opinion that they are a distinct race from the old Prairie Buffalo, so numerous in bygone days; but I am inclined to think that the very slight difference in appearance is easily accounted for by climatic influences, variety of food, and the better shelter of the woods."[8]

In March, 1892, a male was secured by Indians within 50 miles southwest of Fort Resolution, and presented by the Hudson's Bay Company to the Canadian Geological Museum at Ottawa. It was carefully mounted, and is now on exhibition there.

In 1897, Samuel N. Rhoads, of Philadelphia, named this as the type specimen of the variety to which he gave the name *Bison bison athabascæ*.

In 1909, Harry V. Radford, of New York, armed with a permit from the authorities at Ottawa, killed a fine big Wood Buffalo bull. This is now in the Calgary Museum, as already stated.

Numbers

The countless thousands of Mackenzie's day had withered away before the all-destroying white man, with his rifle and Horse. In 1900, the Wood Buffalo was believed to be nearly extinct, some setting the number as low as 50.

In June, 1907, I got into the country, and saw a few. Altogether my

[8]Barren Ground of Northern Canada, 1892, p. 143.

MAP X.—THE WOOD BUFFALO PARK

Ten thousand five hundred square miles, set apart by the Canadian Government on Dec. 18, 1922, for the preservation of the Wood Buffalo

party saw 33, and estimated that about 300 still remained. We were satisfied, after full investigation, that hunters with rifles, not Wolves, were destroying them. The result of this report was new police regulations, and a Police Patrol. Under this kindly arrangement, the Buffalo increased.

In Sept., 1914, Francis Harper, of the Canadian Geological Survey, assisted by the Buffalo Guardian, Peter McCallum, spent a week in the Wood Buffalo country; and estimated them at 500.

The following appears in his Report: "According to McCallum, the Wood Buffaloes are divided into two main groups. It was the southern herd whose territory we had entered, while the range of the other lies northwest of Fort Smith near Little Buffalo River. Part of the northern herd was reported to have been seen within 20 miles of Great Slave Lake during the winter of 1912–13. The two ranges are separated, McCallum said, by a strip of jack pine country 20 or 30 miles wide, in which he has seen hardly a trail. He estimated that there were about 500 animals in the two herds, the northern one being slightly the larger."

In the summer of 1922, Maxwell Graham, the alert representative, of the Northwest Territory and Yukon Branch, Dept. of Interior, made a reconnaissance of the Buffalo Range. He says: "During numerous journeys on horseback, and on foot, the writer saw a total by actual count, of 114 Buffalo." He estimated the number at 1,500—500 in the north herd and 1,000 in the south.[9]

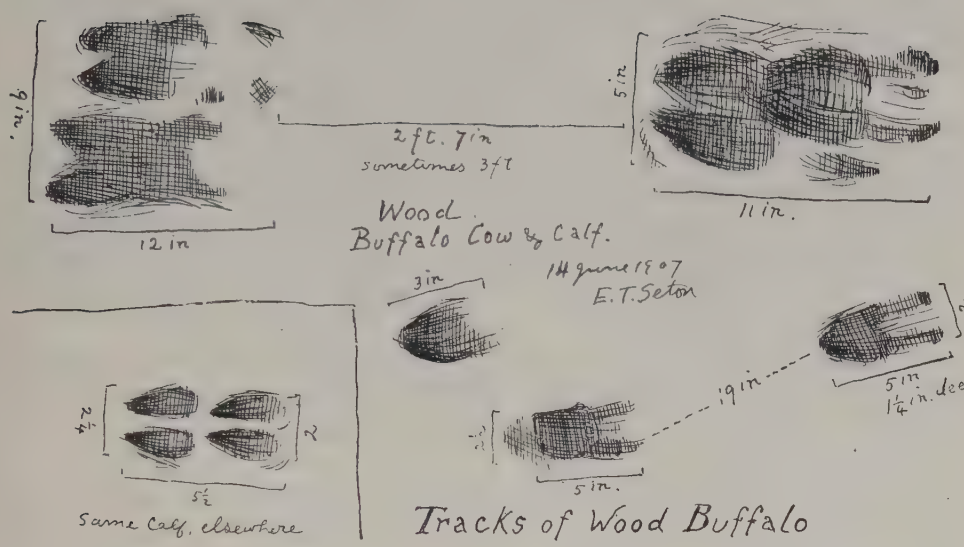
On Dec. 18, 1922, His Excellency Lord Byng, Governor-General of Canada, established a National Park for the Preservation of the Buffalo, consisting of about 10,000 square miles, to be known as the Wood Buffalo Park. In this, the Wood Buffalo is adequately protected by the efficient Department of the Interior at Ottawa. The herds are increasing, and there is little danger of their extinction.

Before leaving the subject, it is well to remind scientists that in this park there are two separate herds of the Buffalo—the northern herd, which is the typical group of true *athabascæ;* and the Peace River herd, which, according to some, is between the Wood and Plains Buffalo. It is to this southern herd that the surplus from Wainwright Park is being added at the rate of 1,500 per annum, as we have seen.

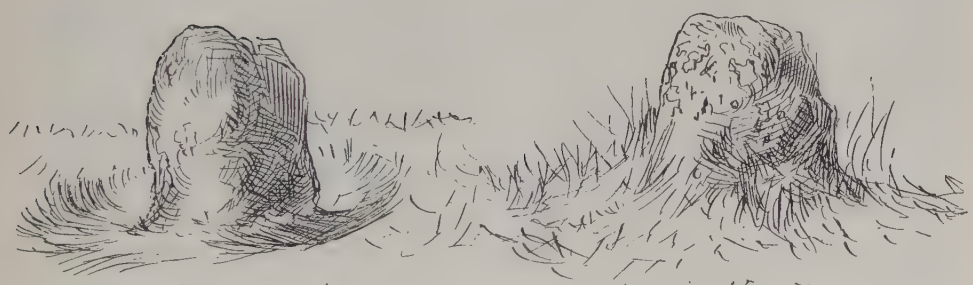
Meanwhile, under permit from the Dominion Parks Branch at Ottawa, a series of specimens, skulls and skins of the Wood Buffalo are being gathered for museums; so that the scientific record shall be complete.

It is only fair to add that many scientists strongly disapprove the importation of the Wainwright Buffalo to the Wood Buffalo Park. Among

[9]Canada's Wild Buffalo, Dept. Int., 1923, pp. 8–10.



Tracks of Wood Buffalo



A. Buffalo-rubbed boulder B. Boulder in New England.

Plate CV. — Buffalo tracks & signs

those who have entered vigorous protests are Dr. Francis Harper, Prof. Wm. Rowan, H. E. Anthony and many others. They forecast that it will mean the absorption and total loss of that superb subspecies, the Wood Buffalo.

The Wood Buffalo at Home

My own meeting with this forest giant was in 1907. I was on my way to the Barren Grounds, but made a side-trip from Smith's Landing to locate the Buffalo. My companion was Major A. M. Jarvis, of the Mounted Police, and our guide was Sousi Beaulieu, a French half-breed who promised to show us Buffalo, and gave me a chance to photograph them, within 36 hours of Smith's Landing.

On the afternoon of June 13th, we three left the Landing, camping at night on Salt River. On the second day, we traversed a pleasant, rolling country of poplar woods, alternated with open glades.

As we rode along, Sousi prattled cheerfully in his various tongues—English, French and Chipewyan. But his steady flow of conversation abruptly ended when, about 2 P. M., we came suddenly on some Buffalo tracks—days old, but still Buffalo tracks. All at once and completely, he was the hunter. He leaped from his Horse and led away like a hound.

Ere long, of course, the trail was crossed by two fresher ones; then we found some dry wallows and several very new tracks. We tied up the Horses in an old funnel pit and set about an elaborate hunt. Jarvis minded the stock; I set out with Sousi, after he had tried the wind by tossing up some grass. But he stopped, drew a finger-nail sharply across my canvas coat, so that it gave a little shriek, and said "*Va pa*," which is "*Cela ne va pas*" reduced to its bony framework.

I doffed the offending coat, and we went forward. First we circled a little to eastward, tossing grass at intervals; but finding plenty of new sign, went northerly and westward till most of the new sign was east of us. Sousi led off, telling me to step in his tracks and make no noise. I did so for long, but at length a stick cracked under my foot; he turned and looked reproachfully at me. Then a stick cracked under *his* foot; I gave him a poke in the ribs.

At the edge of an opening, he pointed across to the far woods, and said, "They are there." We sneaked with the utmost caution that way—it was impossible to follow any one trail—and in 200 yards, Sousi sank to the ground, gasping out, "*Là! Là! maintenant faites son portrait au tant que vous voudrez.*" I crawled forward and saw—not one, but *half a dozen* Buffalo.

PLATE CVI.—WOOD BUFFALO DRY WALLOWS—FROM LIFE

PLATE CVII.—WOOD BUFFALO HERD SKETCHED FROM LIFE

"I must be nearer," I said; and, lying flat on my breast, holding high the camera, I crawled, toes and elbows, up to a bush within 75 yards, where I made shot No. 1, and saw here that there were 8 or 9 Buffalo, one an immense bull.

Sousi now cocked his rifle. I said emphatically: "Stop! you must not fire!"—"No?" he said in astonished tones that were full of story and comment. "What did we come for?"

Now I saw that by backing out and crawling to another bunch of herbage, I could get within 50 yards.

"It is not possible," he gasped.

"Watch me and see," I replied impatiently. Gathering all the near vines and twisting them around my neck, I covered my head with leaves and creeping plants; then proceeded to show that it *was* possible. Sousi followed. I reached the cover, and found it was a bed of spring anemones on the far side of an old Buffalo wallow; and there in that wallow, I lay for a moment revelling in the sight. All at once it came to me: Now indeed was fulfilled the long-deferred dream of my youth, *for in shelter of those flowers of my youth, I was gazing on a herd of wild Buffalo.*

Slowly I rose above the cover, and took my second picture. But the watchful creatures, more shy than Moose here, saw the rising mass of herbage, or may have caught the wind, rose lightly and went off. I noticed now, for the first time, a little red calf; 10 Buffalo in all I counted. Sousi, standing up, counted 13. At the edge of the woods, they stopped and looked around, but gave no third shot for the camera.

I shook Sousi's hand with all my heart; and he, good old fellow, said fervently in French: "Ah, it was for this I prayed last night; without doubt, it was in answer to my prayer that the Good God has sent me this great happiness."

Back at camp, that night, the old man's tongue was loosed; and he told me how the chiefs in conference, and everyone at the Fort, had ridiculed him and his Englishmen—"who thought they could walk up to Buffalo and take their pictures."

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THE BRAVE LITTLE PIGS

Peccary, Collared Peccary, Texas Peccary, Muskhog, Wildhog, Javeline, Haveline

Pecari angulatus (Cope)

Pecari, Brazilian (*Tupi*) *pe*, path; *caa*, wood; *ri*, much, many—i. e., an animal which makes many paths through the woods. (Liais) L. *angulatus*, angular, referring to the nasal bones.

Dicotyles angulatus Cope, 1889, Amer. Nat., Feb., p. 147.
Pecari angulatus Miller, 1912, North Amer. Land Mamm., 1911, p. 383.

Type Locality—Guadalupe River, Texas

Mexican, *Javeline*, referring to the tusks; *Moran* (Kennerley, Mamm. Mex. Bd., p. 50).
Canal Zone, *Zajino* (Goldman, Mamm. Pan., p. 73).
Guaranese, *Taytetu* (Azara, p. 122) Brazilian, *Tajacu*, given by Buffon as a native name.
All Saint's Bay, *Pelas* (Azara, p. 124).

Mayne Reid, speaking of the White-lipped species, says that in Paraguay, it is "known as the '*vaquira*,' whence our word 'Peccary.'"[1]

The Family *Tayassuidæ* consists of middle-sized, digitigrade animals, clad in bristles; teeth in both jaws, well-developed. They have the snout and general form as in the Old World Pigs; but differs from *Sus* and the other Old World genera, in having only 4 upper incisors, and only 3 premolars on each side, above and below; the incisors rooted, and the upper canines directed downward, with sharp cutting hinder edges. Their median metacarpal and metatarsal bones are ankylosed into cannon-bones; and an odorous gland occupies the top of the rump. Toes, 4 on the fore feet, and 3 on the hind feet (the 5th wanting). Tail, a mere knob. Confined to the New World.

The genus *Pecari*, Reichenbach, 1835, comprising the Collared American Pigs, has further, small size, a white collar, and many cranial peculiarities.

$$\text{Teeth: Inc. } \frac{2-2}{3-3}; \text{ can. } \frac{1-1}{1-1}; \text{ prem. } \frac{3-3}{3-3}; \text{ mol. } \frac{3-3}{3-3} = 38$$

[1]Hunters' Feast, p. 114.

In addition to the generic characters, the Collared Peccary has the following:

Size and Weight. Total length, 34¼ to 40 in. (870 to 1,016 mm.); tail, ½ in. (12 mm.); hind foot, 8¼ in. (210 mm); height at shoulder, 32⅛ in. (816 mm.).

"The sexes are practically of the same size, an adult ♂ and ♀, taken from the same herd on the San Bernardino River, weighing respectively, 46 and 44 lbs. avoirdupois."[2]

Colour. In general, more or less black, plentifully peppered over on the head and back with white, caused by white bands on each stiff bristle. This gives a coarse gray effect. A whitish or tawny band or collar on each side of the neck, passes up and back nearly to the spine.

Sexes alike.

Young. "The young when newly born, are plain yellowish gray on limbs and under parts; above, brownish yellow mixed with black, with a black vertebral stripe extending from the occiput to the gland on the rump; tip of ear dusky. Sometimes the shade of colouring is decidedly reddish in young Peccaries. In growing older, the black vertebral stripe grows less conspicuous, as black gradually becomes the predominant colour of the upper surface; but the collar and pale annuli do not lose their reddish shade until the animal has nearly grown to mature size."[3]

Races

The following forms have been recognized:

angulatus Cope, the typical form. T. l., Guadalupe River, Texas.

sonoriensis Mearns, a large, grayish animal with a black dorsal stripe. T. l., San Bernardino River, Sonora, Mex.

humeralis Merriam, similar to *angulatus*, but sides grayer; head, yellower; dorsal black band, more strongly marked, almost as sharply as in *sonoriensis* from Arizona; shoulder stripes, yellowish fulvous. T. l., Armeria, Colima, Mex.

crassus Merriam, a very large, pale form. T. l., Metlaltoyuca, Puebla, Mex.

yucatanensis Merriam, a small pale form. T. l., Tunkas, Yucatan, Mex.

crusnigrum Bangs, a remarkably dark, richly coloured animal with tawny shoulder stripes. T. l., Boquete, Chiriqui, Panama.

[2]Mearns, Mamm. Mex. Bd., p. 167.

[3]Mearns, Mamm. Mex. Bd., p. 161.

nanus Merriam, a very small dark species. T. l., Cozumel Island, Yucatan, Mex.

bangsi Goldman, a dark form similar to but paler than *crusnigrum*. T. l., Boca de Cupe, eastern Panama.

Range and Haunts

The northern range of the Collared Peccary in North America nearly coincides with the northern boundaries of the Lower Sonoran Fauna. Its north limit is a little short of this now, though formerly it reached the Red River in Arkansas. Southward, it extends through Central America, into South America, as far as Patagonia.

The two quite distinct areas which it inhabits north of the Mexican border—namely, southern Texas and southern Arizona with a corner of New Mexico—have each a distinguishable and peculiar form of Peccary, separated by the high backbone of Mexico, which forms a long dagger of Upper Sonoran and higher faunal zones between them.

In Texas, within the confines of their geographical life-zone, Peccaries are usually found in the forests; and prefer low and marshy grounds, as does the common Hog. They wander wherever they can find a supply of food. Often they enter the fields of the planters, and commit great depredations on their crops.

In Southwestern Texas, however, according to Mearns, "they prefer rocky walls of canyons and the vicinity of streams or hilltops where caverns and hollows afford protection, to which they retire during midday. On Las Moras Creek, in Kinney County, Texas, they often join herds of domestic Swine, feeding on roots, acorns and pecan nuts in company with the half-wild Pigs known as 'Razor-backs.'"[4]

West of the divide, according to the same authority, "on the San Luis Mountains, they were found from the lower edge of timber up to the highest summits, as well as on those parts of the surrounding plains and playas where the nolinas, mesquites and mimosas grew abundantly."[5]

Thus, in northern Mexico, southern Arizona, and southern New Mexico, they are equally at home among scattered growth of low, dense cactus and chaparral, on plains, in the rocky foothills, or among the dense swampy undergrowth of river bottoms—apparently indifferent to their surroundings, so there be a measure of cover, and plenty of food.

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[4]Mamm. Mex. Bd., p. 162.

[5]As above, p. 166.

In tropical America, they inhabit the jungles and dense forest undergrowth from the lower levels, well up on the slopes of high mountains.

On the home range of the family, there is no complete evidence. One often hears the phrase, "There is a herd of Muskhog living in that thicket"; implying that this is their home, and that they can be found in it at any time. It seems certain that, although they have one place for sleeping and others for feeding, these are never far apart. Evidently these interesting little Hogs are possessed of a home love incompatible with far travelling.

Numbers

In the palmy days of the '50's and '60's—yes, even as late as the early '80's—Peccaries abounded in much of Texas; and were particularly plentiful in the southern part of the State, where low, dense thickets covered much of the country. Then came the Destroyer, the sordid white man with his destructive weapons. The territory of the little Pigs rapidly shrank.

"On Silver Creek, in southeastern Arizona," says Mearns in 1892, "these animals are periodically abundant, and many have been killed by hunting parties from the old post (now abandoned) of Fort Bowie."[6]

In April of the same year, Col. Theodore Roosevelt made a trip after Peccary along the Frio River, near Uvalde, Texas, and wrote as follows:

"There had been many Peccaries, or as the Mexicans and cowpunchers of the border usually call them *Javalinas*, round this ranch a few years before the date of my visit. . . . Many anecdotes were related to me of what they had done in the old days when they were plentiful on the ranch. They were then usually found in parties of from 20 to 30, feeding in the dense chaparral."[7]

In 1892–93, when Dr. E. A. Mearns was on the Mexican Boundary Survey, he wrote: "Though greatly reduced in number, Peccaries are still common in southwestern Texas.[8] "Peccaries abound in the Pajarito Mountains and at La Osa, Pima County, Arizona."[9] "They were abundant at Pozo de Luis, Sonora, where they usually frequented rocky hills. Their tracks and wallows were seen everywhere about the base of the mountains."[10]

These, however, were scattered localities. Taking the region all to-

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[6]Mamm. Mex. Bd., p. 167.
[7]Wild Hunt., pp. 350–51.
[8]Mamm. Mex. Bd., p. 162.
[9]As above, p. 168.
[10]As above, p. 168.

gether, "On the whole, Peccaries were not abundant on the boundary strip."[11]

But this was 30 years ago. We must now write the customary melancholy summing up: Formerly abundant within our borders, now practically extinct.

In Mexico, things are not quite so bad; the little Muskhog is still found plentifully in many regions. And farther south, in Central America, it is said to be nearly as plentiful as 50 years ago. In the Panama Canal Zone, according to Goldman, it is well known as the "Zajino" and doubtless ranges in the forests throughout the Republic. "Although occurring in much smaller herds than the White-lipped Peccary, it is more frequently met with, and seems to exceed that species in numbers. Parties of 5 or 6 to 12 or 15 individuals are not uncommonly met with; and lack of time to devote to the species, alone prevented me from securing a large series of specimens.

"A few small tracks and the depressions left where these Peccaries have been rooting or wallowing in mud, may often be seen in isolated parts of the forest. Fresh Peccary work was seen nearly every day not far from camp in the forest at about 800 feet on the basal slope of Cerro Azul; but I did not see any of the animals, probably owing to their becoming alarmed at shots frequently fired at other game."[12]

The Epoch of Slaughter

The extirpatory destruction began, of course, when the white man came into full possession. William P. Smith reported from Texas in 1833: "From 5 to 15 planters together, and occasionally a larger number of hunters, would join in the pursuit of these ravagers of their cornfields, in order to diminish their number and prevent their further depredations, as at times they would nearly destroy a farmer's crop. Since this time, however, their number has greatly decreased, and it is now a difficult matter to find them."[13]

Roosevelt thus sums the story of the mop-up in Texas: "Until 1886, or thereabouts, these little Wild Hogs were not much molested, and abounded in the dense chaparral around the lower Rio Grande. In that year, however, it was suddenly discovered that their hides had a market value, being worth 4 bits—that is, half a dollar—apiece; and many Mexicans and not a few shiftless Texans went into the business of hunting them as a means of livelihood. They were more easily killed than Deer, and, as a result, they

[11]Mamm. Mex. Bd., p. 168.

[12]Mamm., Pan., p. 73.

[13]Quoted by Bachman. Q. N. A., I, p. 238.

were speedily exterminated in many localities where they had formerly been numerous; and even where they were left, were to be found only in greatly diminished numbers."[14]

His Use of the Musk

The Musk Gland and the Tail. Even the earliest observers of the Peccary seem to have been impressed chiefly by the musk gland on the small of the creature's back. Thus:

Lionel Wafer's observations, made in 1681, are quoted as follows: "The Country [Panama] has of its own a kind of Hog, which is called *Pecary*, not much unlike a Virginia Hog. 'Tis black, and has little short Legs, yet is pretty nimble. It has one thing very strange that the Navel is not upon the Belly, but the Back: And what is more still, if upon killing a Pecary the Navel be not cut away from the Carcass within 3 or 4 hours after at farthest, 'twill so taint all the flesh, as not only to render it unfit to be eaten, but make it stink insufferably. Else 'twill keep fresh several days, and is very good wholesome Meat, nourishing and well tasted."[15]

"Wafer evidently mistook the dorsal gland for the navel. As stated by him, the part is removed as soon as possible after the animal is killed, and should not be allowed to touch meat intended for food."[16]

Similarly, Azara, who wrote 1783 to 1796, concerning the two Peccaries: "They have, moreover, upon the back, and above the buttocks, what in this country is called *catinga*, that is, a gland whence flows a liquor like thick serum, which has a disagreeable smell in the first species [*T. pecari*], although I found it agreeable and like sweet musk in the second [*P. angulatus*]."[17]

Both sexes bear this scent-gland. It is situated on the pelvis about 8 inches above the knob of a tail; and, like all such, is primarily a deep fold in the skin. It is about 2 inches in diameter, and half an inch thick. The musk is, at times, very strong, and has evident affinity with that produced by Muskdeer and by Skunk.

These musk-glands are usually developed as part of a signal system, as in Deer, Antelope, and Wolves; and there can be no doubt that as such they serve the Peccary. Chapman Grant expressly says that the musky odour enables the young to find and follow the mother. Also that "habitu-

[14]Wilderness Hunt., p. 350.

[15]A New Voyage and Description of the Isthmus of America (1699); 3d edition, quoted here, 1729, p. 328.

[16]Goldman, Mamm. Pan., p. 73.

[17]Quad. Para., p. 116.

ally, the boars rub their backs on low limbs to leave their trade mark behind, and thus mark out their range."[18] The habit is nearly universal among animals, and is discussed in more than one of these Lives. This is using the musk as a property mark.

Finally—and this also has many precedents—certain emanations are a warning to the rest of the herd,—a crude but tremendously effective mode of communication between the different members of the clan, between the pairs, and between the parents and young. It also serves as a means of expression. William P. Smith pointedly states that the "odour is emitted whilst the animal is excited."[19]

Chapman Grant says: "One moonlight night, I walked into a herd of sleeping Peccaries which started up with grunts, snorts, and a clicking of tusks. A wave of musk of great intensity arose, and spread so quickly that I feel sure that it literally must have been forcibly ejected from the glands."[20]

But in their highest specialization, the musk-glands become weapons of defense, as in the Skunk, the Weasels, the Teledu of Java, and maybe, also, in the Muskdeer, the Muskox, and in the present, the Muskhog, as we shall see.

Apparently correlated with this skin-gland in some cases, are the size and use of the tail. The tail, in animals, is notably variant in function. It may be developed for a club as in the alligator; for a hand, as in the Possum; for a parachute, as in the Gray-squirrel; for a comforter, as in the Fox; for a wigwag signal, as in the Whitetailed Deer; for a fly-flapper, as in the Buffalo. Or it may be dispensed with altogether; that is, reduced to a mere knob, as in the Muskox, the Muskdeer, and the Muskhog.

At once, we are struck by the similarity of the last three cases. These animals live in regions where mosquitoes abound. A fly-flapper tail would surely be useful. Each has near relatives to whom the tail serves as a fly-flapper; yet each has given up its tail and evolved instead a penetrating musk. By all the rules of the game, this musk ought to be an effective mosquito repellent. It may be so; but at present, there is little or no evidence to prove—or to disprove it.

It is quite certain, at least, that the musk is no protection against ticks. Azara says of both species of Peccary:

"They are commonly covered with ticks (*garrapatas*) which fasten on them in the woods."[21]

[18]Big Game, p. 1387.
[19]Q. N. A., I, p. 239.
[20]Big Game, p. 1387.
[21]Quad. Para., pp. 115–16.

Flesh. All observers agree that the musk-gland should be cut off at once after the animal is killed; or in a single hour it gives the meat so strong a taint that it cannot be eaten. With this precaution observed, the flesh of the Peccary is used, and generally prized for food. According to De la Borde:

"Their flesh has an excellent taste, but is not so tender as that of the domestic Hog; it resembles the flesh of the Hare, and has neither lard nor grease."[22]

William P. Smith, who went to Texas in 1841, collecting wild animals, says: "The flesh of the female is good at some seasons of the year but that of the male is strong, coarse and disagreeable at all times."[23]

In similar vein, Chapman Grant writes: "The flesh of a young sow is delicious food, but that of the older animals, or the boars, is very musky and not fit for food. The musk-sac must be removed from the animal as soon as it is killed, if the flesh is to be eaten."[24]

Hunting the Peccary

There is little of interest to offer in a chapter on hunting this game little Hog. Azara—to go to the beginning of Peccary history—says: "In capturing them, the natives observe the paths they take, and forming a long hedge of branches on either side with a deep pit at the end, they frighten them by hallooing and other noises, and drive them onwards towards the ditch, which is generally filled with them."[25]

Wm. P. Smith, who set out to capture Peccaries on the Brazos River, Texas, in 1841, says of two that had their nest in a hollow log: "Being late in the day, I was determined not to disturb them till a more favourable time would present itself, as I was anxious if possible, to procure them alive. Some time passed, and everything being ready, the Dogs soon compelled them to make for home, when, they having entered, we secured the entrance of their hole, and cut a large opening up the body of the tree, a few feet above them, from which 'point of vantage' we were enabled easily to drop a noose round their necks, which we tightened until we thought they were nearly suffocated. We then drew them out, tied their legs and feet securely, and fastened their mouths by binding their jaws together with cords, and then left them lying on the ground."[26]

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[22]Quoted in Q. N. A., I, p. 237.
[23]Q. N. A., I, p. 239.
[24]Big Game, p. 1386.
[25]Quad. Para., p. 119.
[26]Q. N. A., I, pp. 238–39.

Roosevelt writes thus of the last band that lived on the Frio River where he hunted in 1892:

"On this particular Frio ranch, the last little band had been killed nearly a year before. There were 3 of them, a boar and two sows; and a couple of the cowboys stumbled on them early one morning while out with a Dog. After half a mile's chase, the three Peccaries ran into a hollow pecan tree; and one of the cowboys, dismounting, improvised a lance by tying his knife to the end of a pole, and killed them all."[27]

Final illustrative paragraphs are supplied by Chapman Grant thus:

"I found a little Negro who killed his Peccaries with a penknife! The Dog would seize the Pig by one ear and hold on until our hero ran up, seized Piggy by the other ear and cut his throat.

"Peccaries cannot be hunted with a jack-light, as Deer are *illegally* hunted, because their eyes do not shine. Their eyes are small, and possibly the Pigs have more sense than to stare at a strange light.

"The Peccaries of the Texas border were nearly exterminated some years ago by hide-hunters who used Dogs."[28]

"It will not be long," he says, "before Peccaries are exterminated throughout the partially settled country, because they are easily followed by Dogs; and they have a fatal failing for going over their old range despite the changes wrought by man. Thus it is not unusual to see a band passing through a yard, or even a camp of soldiers."[29]

The Sociable Little Peccary

This happy little Hog is eminently sociable and gregarious. It is usual to see 15 to 20 or 30 together in one band; although, according to Azara,[30] it goes in "smaller troops" than its White-lipped kinsman. Sometimes the warcry of the old leader, grandma or grandpa, will conjure up an army of a hundred, ready to fight to a finish on behalf of any one of their own tribe. This is nearly an ideal association.

Nelson considers that the leader is usually "the oldest and most powerful boar."[31]

Gregarious animals are such as go in flocks—for example, Caribou—which are merely large groups of separate individuals. Sociable animals are those that unite their efforts for some common cause, and have a sort of

[27]Wild. Hunt., p. 351.
[28]Big Game, p. 1387.
[29]As above.
[30]Quad. Para., p. 119.
[31]W. A. N. A., p. 448.

Plate CIX. — Details of Collared Peccary

organization. The Peccary is a good example of the latter. The leadership of the wise old grandparent has already been noted. The rally of the tribe to protect any single member has often been described; the methodic apportioning of the feeding grounds, and the tact of regular dormitories for the band, are well known. The climax of animal organization is intimated in this paragraph from Roosevelt's "Wilderness Hunter" (p. 351):

"At night," he says, "they sometimes lay in the thickest cover, but always where possible, preferred to house in a cave or big hollow log; one invariably remaining as a sentinel close to the mouth, looking out. If this sentinel were shot, another would almost certainly take his place."

His Private Life

Mating. No one seems definitely to know the mating customs of the Peccary. The analogy of other gregarious animals would point toward polygamy. Nevertheless, Azara definitely states that at times they "go in pairs."[32] and a possible ray of light is found in the incident given by Roosevelt, in which the last band that lived on the Frio River consisted of a male and 2 females. However, the sexes are alike, which points to monogamy.

This much is known: Mating takes place at any time. Being in a warm climate without anything of the nature of winter, as we understand it, the happy Peccary worries not at all about the weather, but merrily makes love the whole year round.

Gestation. In the common Pig, gestation lasts 112 to 116 days. In the Peccary, its duration is not known, but probably it is a little less, for he is a smaller animal.

Young. Even as far back as Azara's day (1783), it was known that the Peccary breeds but once a year, and has 2 young at most in a brood; sometimes only one.[33]

The twins arrive at any season, as already noted; and are clad in a curious reddish hair quite unlike that of the parents—more like that of the African species, who may, by virtue of this fact, be accounted in some sort its kinsfolk.

Domestic Pigs begin to follow the mother when 2 or 3 days old; so we may assume that somewhat the same habit holds among the Peccaries. It is, however, more than likely that the mother brings the young back to the nest for many nights after they are able to follow. It is known to be

[32]Quad. Para., p. 119

[33]As above, p. 118.

the habit of this interesting creature to sleep in a hollow log; and further, it has always shown strong homing instincts.

There is evidently a time when the little red Piglings follow the black mother back to the herd. This coming-out party must be when they are very young—maybe less than a month old—for often they are seen among their big brunette relatives when there still is a great difference in size.

At Home

The Peccary, unlike most of the hoofed animals, sleeps in some sort of a den, and habitually takes refuge in a hole.

De la Borde, quoted by Bachman, states that "when pursued, they take refuge in hollow trees or in holes in the earth dug by the Armadilloes. These holes they enter backwards and remain as long as they can. But when highly irritated, they instantly issue out in a body."[34]

Now, if it be not presumptuous, I should like to rewrite that paragraph, and say: "Peccaries commonly take refuge in such underground burrows as they can find, entering backwards. Here they hide until they can no longer stand the various provocations of the enemy; then come forth fighting mad."

The nest for the young is commonly in just such places, a hollow log being most often chosen.

So far as known, its nursery habits are much like those of the common Pig. Having selected a hole or lair, it prepares in it a nest. Smith further points out[35] that the creature has many sleeping places besides this nursery.

His Daily Fare

Now that the mother and her red-headed twins are back with the clan, the question of food is the most important one in the new young lives.

Audubon and Bachman give the earliest good account of the food habits in Texas, as follows: "This species feeds on fruits, seeds and roots; and, like the domesticated Hog, is constantly rooting in the earth in quest of worms, insects, reptiles, or bulbous roots. It is also said to devour eggs of alligators, turtles and birds; and to be destructive to lizards, toads and snakes. In fact, like the common Hog, it is omnivorous, feeds upon everything that comes in its way, and is not particularly choice in the selection of its food."[36]

To this Smith adds: "Their principal food consists of nuts of every

[34]Q. N. A., I, p. 237.
[35]As above, I, p. 238.
[36]As above, I, p. 237.

description (mast) during winter; but in summer they feed on succulent plants, with which the bottom lands in the Brazos abound."[37]

Bachman continues: "It appears to prefer Indian-corn, potatoes, bread and fruits; but, like the domestic Hog, evinces no unwillingness to take any kind of food that is presented to it. We remarked, however, that it is decidedly less carnivorous than the common Hog."[38]

Chapman Grant writes: "They root for their food, which seems to be principally vegetable, although grubs also undoubtedly are eaten. Cactus, or nopal, forms a considerable portion of their diet, as it does of the Deer, Woodrats and other animals."[39]

E. W. Nelson sums up their diet habit as follows: "They are omnivorous, feeding on everything edible, from roots, fruits, nuts, and other vegetable products to reptiles and any other available animals. They are specially numerous in many tropical forests where wild figs, nut palms, and other fruit-bearing trees provide abundant food. In the arid northern part of their range, dense thickets of cactus and mesquite afford both food and shelter. Their presence in a locality is often indicated by the rooted-up soil where they have been feeding."[40]

When He Meets a Rattlesnake

A very early observation on the food habits of the Peccary is furnished by that delight of my boyhood, Capt. Mayne Reid. Sometimes this good old pioneer romanced a little, but he knew the facts; and this he evidently wished to have accepted for fact as he wrote it. He opens the scene by describing a rattlesnake in a thicket, right in the line of march, that had evidently been selected by an approaching band of Peccaries.

"The rattlesnake, on seeing the first one, had laid his head flat upon the ground; and evidently terrified, was endeavouring to conceal himself in the grass. But it was a smooth piece of turf, and he did not succeed. The Peccary had already espied him; and upon the instant, his hinder parts were raised to their full height, his mane became rigid, and the hair over his whole body stood erect, radiating on all sides outward. The appearance of the creature was changed in an instant, and I could perceive that the air was becoming impregnated with a disagreeable odour, which the incensed animal emitted from its dorsal gland. Without stopping longer than a moment, he rushed forward, until he stood within three feet of the body of the snake.

[37]Q. N. A., I., p. 239.
[38]As above, p. 240.
[39]Big Game, p. 1387.
[40]W. A. N. A., p. 448.

PLATE CVIII.—COLLARED PECCARIES

From drawing by E. T. Seton, 1898
Loaned by the New York Zoological Society

"The latter, seeing he could no longer conceal himself, threw himself into a coil, and stood upon his defense. His eyes glared with a fiery lustre; the *skir-r-r* of his rattles could be heard almost incessantly; while with his upraised head he struck repeatedly in the direction of his enemy.

"These demonstrations brought the whole drove of Peccaries to the spot, and in a moment a circle of them had formed around the reptile, that did not know which to strike at, but kept launching out its head recklessly in all directions. The Peccaries stood with their backs highly arched and their feet drawn up together, like so many angry Cats, threatening and uttering shrill grunts. Then one of them, I think the first that had appeared, rose suddenly into the air, and with his 4 hoofs held close together, came pounce down upon the coiled body of the snake. Another followed in a similar manner, and another, and another, until I could see the long carcass of the reptile unfolded, and writhing over the ground.

"After a short while, it lay still, crushed beneath their feet. The whole squad then seized it in their teeth, and tearing it to pieces, devoured it almost instantaneously."[41]

The Brave Little Peccary

In those glorious books that contributed so much to the joy of our youth—those books that made the atlas the favourite among our school equipment, because its ample covers hid what we really were reading—those books that brought a gleam of surreptitious joy into even the sad slavery of the school hours—the Peccary was painted as the embodiment of heroism, a small fierce little creature of such perfect organization and so valiant a soul, that no beast in his woods dared molest him; and even man was wary of attacking, unless in a safe, high place, and supplied with plenty of ammunition.

Capt. Mayne Reid and George Catlin were chiefly responsible for these happy dreams; but there were hosts of lesser witnesses. And the Peccary stood enshrined among our animal heroes—the embodiment of valour, without fear, without reproach.

Then came the inevitable reaction. The iconoclast—which is Greek for the "sneerer"—saw his chance. Good sneers, humiliating, pungent, acrid sneers were joyfully possible; and this, for example, we found in perfectly respectable print:

"Tales of the ferocity of bands of the Collared Peccaries and of their treeing hunters who have disturbed them, read well to the novice, but have

[41]Hunters' Feast, pp. 121–22.

little foundation in fact. In reality, the animals are shy and retiring, and fight only when forced to do so for self-protection."

Yes, I know I'm a novice. I never saw a wild Peccary in my life; and, much as I longed for it, I never was treed. Those lovely heroic stories did read well to me.

Now, see here, I've given up my King Arthur, I've given up my William Tell, I've given up my Robin Hood. But I will *not* give up my Peccary.

I have looked around for help, for supporters, for the making of an army; and I have found some invincibles. I array them now, and defy the Greek sneerer:

First the immortal Audubon, talking of Peccaries says: "When attacked by the Jaguar, the Puma, the Wolf, the Dog, or the hunter, they form themselves into a circle, surrounding and protecting their young, repelling their opponents with their sharp teeth, and in this manner sometimes routing the larger predatory animals, or severely wounding the Dogs and the hunters."[42]

W. P. Smith, who lived with Peccaries in the '40's, says: "This animal, which in Texas is always called the Wild Hog, is considered the bravest animal of these forests, for it dreads neither man nor beast."[43]

In the early days of Texas (1833), this same naturalist continues: the Peccary "struck terror into the hearts of the settlers in their vicinity, oftentimes pursuing the planter whilst hunting or in search of the lost track of his wandering Cattle—at which time they frequently killed his Dogs, or even at times forced him to ascend a tree for safety, where he would sometimes be obliged to wait until the Hogs got tired of dancing attendance at the foot of his place of security, or left him to go and feed. These animals appeared quite savage, and would, after coming to the tree in which the planter had ensconced himself, snap their teeth and run about and then lie down at the root of the tree to wait for their enemy to come down."[44]

Mearns, who knew so much about Peccaries that he could make two species out of one, relates that "the late Major Charles E. Bendire shot Peccaries during the period from 1857 to 1859, near the spot where Lieut. [Howard B.] Cushing, of the Third Cavalry, was killed by Indians in the Whetstone Mountains of Arizona, and also in the Chiricahua Mountains, and near the old mission of San Xavier, in the Santa Cruz Valley. At the latter place, the major witnessed an amusing incident—the treeing of a Negro servant by a band of infuriated Peccaries. Although stories of

[42]Q. N. A., I, pp. 236–37.
[43]As above, p. 239.
[44]As above, p. 238.

similar occurrences are commonly repeated by the white settlers of the Southwest, this is the only instance of an attack made on man by Peccaries, that has come to me on unimpeachable evidence."[45]

Roosevelt, the intrepid, writes that the Peccaries "were subject to freaks of stupidity, and were pugnacious to a degree. Not only would they fight if molested, but they would often attack entirely without provocation.

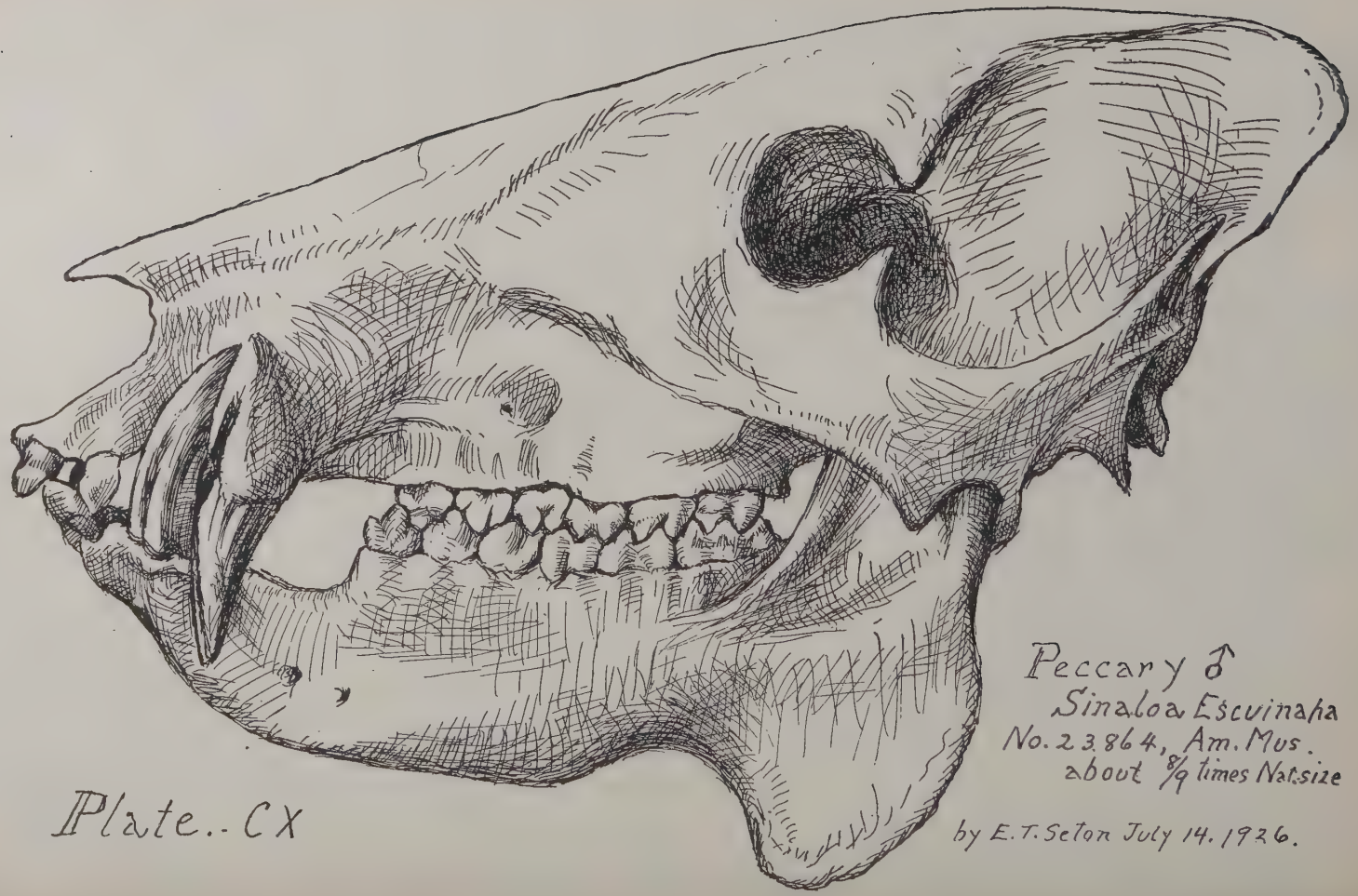
"Once my friend, [John] Moore himself, while out with another cowboy on horseback, was attacked in sheer wantonness by a drove of these little Wild Hogs. The two men were riding by a grove of live-oaks along a wood-cutter's cart track, and were assailed without a moment's warning. The little creatures completely surrounded them, cutting fiercely at the Horses' legs and jumping up at the riders' feet. The men, drawing their revolvers, dashed through and were closely followed by their pursuers for 300 or 400 yards, although they fired right and left with good effect. Both of the Horses were badly cut. On another occasion, the bookkeeper of the ranch walked off to a water-hole, but a quarter of a mile distant, and came face to face with a Peccary on a Cattle trail, where the brush was thick. Instead of getting out of his way, the creature charged him instantly, drove him up a small mesquite tree, and kept him there for nearly two hours, looking up at him and champing its tusks."[46]

Those who wish to read a story of animal heroism that will thrill them, are advised to see Wheeler's "Battle with Wild Hogs." It is the story of an Arizona Peccary hunt. I wish I could give it in full here. I rejoice in it as far as it was a Peccary victory—dear-bought, but still a victory. The way in which those brave little Pigs sliced up that big, loud-mouthed Dog, carefully bred for ferocious fighting—the way in which they punished that hunter, in spite of his repeating rifle, gives me some of the same satisfaction that one feels on reading the story of Leonidas's hard-won victory at Thermopylæ. (See References.)

Chapman Grant, one of the latest authorities, says: "There are many stories current of the ferocity of these little Pigs. Many hunters claim that they are dangerous, and attack when wounded or to protect their young. Close inquiries fail to elicit authentic information of any one actually being hurt by them, but numerous stories prevail of hunters being treed by infuriated Peccaries."[47]

And again this same sportsman says: "Judging by the rapidity with

[45]Mamm. Mex. Bd., p. 167.
[46]Wild. Hunt., pp. 351–52.
[47]Big Game, p. 1386.



Peccary ♂
Sinaloa Escuinapa
No. 23864, Am. Mus.
about 8/9 times Nat. size

Plate.. CX

by E. T. Seton July 14. 1926.

which these little Pigs can travel through the brush, I believe it would be very difficult for an active man to climb a tree, even were one right at hand, before being overtaken. I have shot Peccaries, and had a bunch of from 5 to 15 scurry past me under the brush in open formation. Those that passed near by, would see me, and snap their tusks and raise their manes; and I believe that this helter-skelter scurry for safety is often mistaken for a charge, when really the little Pigs are merely running in the direction in which they were headed when startled. I am positive that I could not successfully have escaped by climbing a tree had they really been after me."[48]

In short, each writer begins by belittling the courage of the Haveline; then admits that they are dangerous and desperate enemies if any one declare war on them by threatening or injuring one of the clan.

The Case Against

Now let us array the testimony of the other side. First and oldest, Azara, says:

"It is also asserted that this species, if offended, will unite together, and surround man and Dogs, and tear them to pieces, should they not succeed in escaping by flight, or by climbing a tree: I believe this, that however generally reported, to be a gross exaggeration; for I have frequently hunted them with Dogs and servants, and have never observed that they made use of any means of defense save that of flight."[49]

Similarly Mearns aspersively relates: "I have met with bands of Peccaries on a few occasions when some of them were shot. They were always wild and shy, exerting themselves to the utmost to escape, and paying no attention to the unfortunate ones that were killed or wounded. In one instance, when hunting in the Cobota Mountains, Sonora, in company with Lieut. William H. Bean, of the Second Cavalry, I wounded a female Peccary standing in the midst of a drove of them with her young beside her. Although she squealed loudly, the remainder of the band rushed off and left her. A moment later, we came upon her among the bushes and cacti, but she arose and escaped from us without attempting to defend her young, which were no larger than Cottontail Rabbits."[50]

Leaving out the whole question of individual variation which makes it so dangerous, yes, futile, to found a generalization on one or two instances, it should be remembered that a hundred years ago, the Gray-wolf was danger-

[48] Big Game, p. 1386.
[49] Quad. Para., p. 118.
[50] Mamm. Mex. Bd., p. 167.

ous to man; but, having learned the lesson of guns, their invincibility, their irresistible, inevitable destructiveness, he has become the shyest of wild things.

It seems that some such explanation exactly applies here. In the old and early days, the Peccary was a fearless desperado, defiant of any creature, even man. Now he has seen the light; new weapons have made a very different problem! To fight is suicide indeed. The Peccary is wise as he is valiant, and he now adopts the only course that promises safety. In support of this view, I quote from Azara:

"Mons. De la Borde[51] relates that 'they are easily shot; for instead of flying, they assemble together, and often give the hunters an opportunity of charging and discharging several times.' He mentions 'that he was one day employed, along with several others, in hunting these animals, accompanied by a single Dog which, as soon as they appeared, took refuge between his master's legs. For greater safety, he with the other hunters stood on a rock. They were nevertheless surrounded by the herd of Hogs. A constant fire was kept up, but the creatures did not retire till a great number of them were slain.' '*These animals however*,' he remarks, '*fly after they have been several times hunted.*'"[52]

The italics are mine, because, in that sentence, I see a way to reconcile the clashing testimony of so many reliable witnesses. And Roosevelt concludes his Peccary chapter with a similar statement. "In the old days, it had been no uncommon thing for a big band to attack entirely of their own accord, and keep a hunter up a tree for hours at a time." But now they were reduced to a remnant "and the survivors were learning some caution."[53]

The Wise Little Peccary

Through the intimate descriptions of naturalists who have followed the valiant Peccary in many of the stress-times of his life, we have learned that he can change his ways to meet changing conditions. Now we can learn, through testimony, that this happy little Hog, brave as a Lion, can be wise as a serpent.

Says Mearns: "It is only by accident that they are discovered in their retreats during the middle of the day; but at morning and evening, herds of them may be seen feeding in the open. . . . Although signs of Peccaries were abundant in an extensive area of oak scrub (*Quercus emoryi*) around Monument No. 64, at timber line of the east base of the San Luis Mountains,

[51] D'Azara, Quad. du Para., I, p. 31.
[52] Q. N. A., I, p. 237.
[53] Wild. Hunt., p. 360.

the creatures were so clever at hiding that none could be seen, although we frequently came so near them that their peculiar odour was very evident."[54]

The Friendly Little Peccary

He will associate freely with the common Hog, but will not hybridize with it.

Another pleasant friendship is thus outlined by Chapman Grant: "White-tailed Deer seem to get along amicably with their small neighbour, the Collared Peccary, or 'Jabeline,' . . . as I have seen 8 or 10 Deer feeding among a bunch of possibly 20 Peccaries in thorn brush."[55]

According to all testimony at hand, the Peccary, if taken young, is easily tamed, and becomes a delightful and intelligent pet. Chapman Grant says:

"If taken and raised on a bottle, they become affectionate pets, and later develop into very jealous and ferocious watchdogs; but for the safety of strangers they must be killed or confined when a couple of years old."[56]

Bachman says: "We have frequently seen the Collared Peccary in confinement. One that is at present (1846) in a menagerie in Charleston, is exceedingly gentle, taking its food from the hand, and allowing itself to be caressed even by strangers. It lies down in the manner of a Pig, and next to giving it food, the greatest favour you can bestow on it is to scratch it either with the hand or a stick. It, however, is easily irritated. We noticed that it has a peculiar antipathy to the Dog, and when approached by that animal, immediately places itself in a defensive attitude, raising its bristles, showing its tusks, stamping its feet, and uttering a sharp cry which might be heard at the distance of 70 yards. When in a good humour, however, it occasionally utters a low grunt like a Pig. It seems to suffer much from cold, and is always most lively and playful on warm days."[57]

Mearns tells of sundry tame Piglets that he met: "At the La Osa ranch Mrs. W. S. Sturges had several as pets that had been presented when very young by Papago Indians whom she had befriended. They became gentle and affectionate if not maltreated; but exceedingly vicious if teased and hurt. One that I bought from a Mexican lad was fondled and kissed by its owner, who parted from it with tears. It followed us about in the camps, where, from its habit of rubbing against one, it received several hard kicks from frightened teamsters at night, which wrought such a change in its previ-

[54]Mamm. Mex. Bd., p. 167.
[55]Big Game, p. 1386.
[56]As above, p. 1387.
[57]Q. N. A., I, pp. 239–40.

ously friendly disposition that no one could safely approach it, on which account I was obliged to send it to the National Zoological Park, where it became tractable."[58]

A particularly joyful picture is presented by E. W. Nelson. "Young Peccaries," he says, "become very tame and make most intelligent and amusing pets. One moonlight night on the coast of Guerrero, two of us, after a bath in the sea by a small Indian village, strolled along the hard white sand to enjoy the cool breeze. Suddenly a little Peccary, not weighing over 8 or 10 lbs., came running to meet us, and after stopping at our feet to have its head scratched, suddenly circled about us, away and back again in whirling zigzags, with all the joyous frenzy of a playful puppy. Continuing this performance, it accompanied us for several hundred yards, until we returned to the village."[59]

It is, of course, the final proof of domestication, when the creature is not only tame and tractable, but also breeds in captivity. Bachman says of those that he observed:

"The Collared Peccary is easily domesticated, and breeds readily in confinement. We saw a pair on board of a ship that arrived in Charleston from South America, the female of which had produced 2 young whilst on the passage; they were then several weeks old, and seemed to be in a thriving condition."[60]

"We observed at the Zoological Gardens in London, young Peccaries that had been born in the menagerie."[61]

His Way of Life

The big boar is bossing the herd. His wisdom is not merely his own; but, accumulated in his small brain, is all the inherited wisdom of his forbears, manifested as guiding instincts.

One of the elegant young lady-Pigs has been absent for some time. Each day she has been back for a spell—back in society. But the last day or two, she has been wholly out of sight till now. The herd has been rooting out vegetable delicacies, varied with grubs and beetles, and are nearly ready to head for the drinking place before settling for the noon sleep that every Muskhog takes during the heated hours—when back comes the lady-Pig; not alone this time, but followed by two funny little red roasters, not so big as Rabbits, but quick to run, and careful to stay right next their mother.

[58]Mamm. Mex. Bd., p. 168.
[59]W. A. N. A., p. 448.
[60]Q. N. A., I, p. 239.
[61]Q. N. A., I, p. 239

The old boar walks with slow dignity towards them—uttering an inquiring grunt. The mother faces him with mother-fortitude, and yet not without anxiety. The young ones dodge under her body. The big boar champs his teeth a little—very little—and slowly walking up, sniffs, sniffs. He is noting their smell—taking their fingerprints, as it were. And having sniffed, chopped his teeth, and yawned, he goes off. Others of the grown-ups sniff them too. Now the rusty twins have been admitted.

The whole troop heads for the water. There, under the cool palmettos, they lie sprawled till the afternoon is waning.

They are roused—by a whiff on the wind. Not a sound reaches them, but their sensitive nostrils bring notice that a great Cat—a Hunter-cat—is prowling near. With a little snort, the big boar springs to his feet, clicks the four bayonets in his mouth, and flings on the wind an intensified odour of musk. Everyone in the herd responds. The big boar leads the troop, and the sows line up. With manes erected they go, snorting, clicking their teeth, musking. With the recent mother and the two red Piglings in middle rear, they march in a wide and threatening front to hunt that hostile smell.

Soon they rout it out. He tries to hide in a low thicket, but the warrior Hogs are on him—and away dashes the Ocelot. He is swift, but his enemies are as quick, and are all about him before he knows it. In one short round, they will tear his velvet hide to tatters.

But the spotted hunter has a simple answer to their forces. He lightly springs up the nearest tree, and lies in open mockery as they swarm about and click their knives, or shrill their war cries, till they weary. The night comes on, and the Peccaries drift away to seek their evening meal.

It is cool in the Northern tropics when the sudden sun goes down; and once the band is fed, the leader heads for a huge hollow log—their own peculiar fortress. Arrived there, he swings about, investigating near thickets, or doubtful smells.

The Mother with the twins goes first, the rest crowd in; and last, the big fighting boar. At the opening of the log, he takes his stand, face out. No one can attack the herd without first disposing of him. Many a hunter has come, and seeing this keen sentry, has shot him down; then as the next one took his place, shot him down; and the next—and the next,—till only the little ones were left—an easy prey.

But such massacres took place only after guns and men became countless and unrestrained.

In the pleasant nature-balanced woods of the long ago, the sleep of the Peccary band was sweet and unbroken, till the Chachalacca roused them with his sun-up call.

Epilogue

Thus, then, skimping myself of the pleasures of the heroic and the imaginative, I have aimed to draw a true portrait.

Men who can build a big fairy palace out of a very small handful of facts, had given us the Peccary, the fearless Wild Hog—the Chevalier Bayard of his race. Then came the muck-rakers among naturalists. They smirched and crippled and degraded the Peccary till he was nothing but a dirty, cowardly little Pig.

I love the Peccary. He gave me many happy hours behind the "Jography book" in the log schoolhouse. And now I am on the bench to judge him.

But I am not impartial. I want to protect him. I would answer his calumniators. I wish to be true—but will not believe in his poltroonery nor in his baseness. I have looked into all the incriminating, damning documents, disproved their shameful lies, and can honestly say that I hope to leave to literature and to animal-loving children a Peccary that maybe is not so insanely courageous and desperately dangerous as was claimed by the Ananias-Münchausen news-agency,—for he is often afraid, but he masters his fears; often is hurt, yet squeals not. He is brave as any Lion when the odds are not obviously and overwhelmingly too great against him.

He is wise—much wiser than was said; for he knows how to retreat when it is folly to go ahead. He is loyal to his band; he is kind, he makes and keeps pleasant friendships, and is a little finer-cut character than was at one time so luridly set forth.

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A LAMENT

ON REVISITING THE OLD WESTERN RANGES

O God of the blue sky and the gentle rain,
O God of the hills in the West;
If only I could ride as I used to ride
And see the white-sterned Antelope flickering across the distant flat;
Hear the Coyotes yapping at dusk and the long soft note of the Graywolf in the dawning;
If I could see the bounding Blacktail sailing across the upland on his unseen wings,
As the Woodwale swings festooning through the woods:
But gone, gone, gone, is all I loved,
Gone, gone are the big open spaces and the sweetness of the hills.
As I try to pick my way among the barb-wire fences, the sordid settlements, and the piles of empty tins and fly-blown filth, pestilential with maggots and crawling bugs, I have no words to voice my sadness.
Gone are all the big, beautiful animals—not because they harmed us—not because we needed the land, but because we had invented weapons so terrible that the wild things had no chance. And loathsome brutes in human form destroyed them for the hellish joy of seeing them fall.
How gleefully would they have used armoured cars, gatling guns and poison gas, had such things been at hand.

What a glorious West it was—a heritage for the Sons of God.

But the abomination of desolation came to possess it.
The harmless and the beautiful withered away.
Any one that could get a horse and a gun, could kill the Buffalo.
Gone are they, with only an old bone here and there to tell of their one-time myriad race.
Gone are the Elk that bugled so joyously on the uplands.
Gone are the harmless, beautiful Bighorns from the useless bluffs.
Gone are the bannertailed Deer from the meadows.
Gone are the patient Beaver from the swamps.
Gone are the Sage-grouse, too innocent for such a besetting.
Gone are the glorious white Cranes, trumpeters of the springtime.
Gone are the simple Jackrabbits, netted wholesale, and killed with clubs.

Then, ever-intensifying ingenuity mowed down the wiser ones; then the lesser ones;
Then the Wonder-dogs, the Coyotes had to go.
And the Coyote gone, the Ground-squirrels multiplied to billions, and gathered every crop.
Then poison was invoked to destroy the Ground-squirrels.
And it finished its work, but it also killed the ground-feeding birds, so that ticks, bugs, lice, flies, insect-plagues were trillionized—and still the abomination stalks;
The very forests are reduced to blackened stumps; till man at last will be driven forth from the Eden he has ravaged.

And I—I ride with tear-blurred eyes, and turn back and away from the heritage we have desolated, scorched as with fumes of the pit.
I seek my own last home, by the little lake in the rocky hills of Connecticut, and find a measure of joy in the woods, and the wild things I have loved and saved.

But a black cloud hangs over my joy.
I know that this too will wither—is withering even now.
A wild Deer—the last of its race—crossed my land a month ago, and after it were fifty yelling curs.
I suppose they killed it. It had no chance.
Then came a few Woodcock from the North,
But a dozen gunners went after each one of them.
The brooks are marked, surveyed, to be turned into drains.
I hate your cursed, cowardly dogs;
I hate your loud, shameful guns;
I hate your sordid improvements.

The doom of the trees is impending;
The chestnut is gone; the butternut and the white pine are going; the hemlock is dying;
The red-oak and the pignut are threatened,
Nearly all with plagues imported by man.
Even now the browntail and the gipsy moth are sending the scouts of their Sennacherib hosts, and marking all Yankeeland for desolation.
The end is in sight.
The desolation sweeps from sea to sea.

I can find some tiny crumbs of comfort in this alone—
That when it comes complete, I shall not be here to see it.
Only in prevision shall I see it—see my people pay the bitter price of their greed and carnage.

And farther yet my soul-view reaches in the years.
I see the only logical completeness of this hell-born mania to destroy—
This—surely this: the nation possessed of it, will certainly destroy itself.
And when the men of another race, a yellow, or mayhap a red race, shall discover this unpossessed, broad, Western world, landing on Manhattan, they shall marvel at the piles of ancient ruins.
And slowly unearthing shreds of proof, and scraps of records, ancient made,
Their chiefs and wiser ones shall know, that here was a wastrel race, sordid, cruel, sordid;
Weighed and found wanting,
Once mighty but forgotten now.
And on our last remembrance stone,
These wiser ones will write of us:
They desolated their heritage;
They wrote their own doom;
They knew not the things of the Spirit;
They never lighted the fourth lamp of the Woodcraft Altar fire.

THE END

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